

Survey of Residential Pesticide Use in the Chollas Creek Area of San Diego County and Delhi Channel of Orange County, California

Prepared for the California Department of Pesticide Regulation

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of San Diego County and Delhi Channel of Orange County, California**

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Survey of Residential Pesticide Use in the Chollas Creek Area of San Diego County and Delhi Channel of Orange County, California

Executive Summary

The University of California conducted a telephone survey of adults living in the Chollas Creek area of San Diego County and the Delhi Channel area in Orange County, California at the request of the California Department of Pesticide Regulation. Additionally, a mail survey was conducted from a subset of these interviewees to obtain information on their pesticide inventories. The purpose of these studies was to determine the attitudes of non-professional pesticide applicators regarding pesticide choice, use, and disposal in and around homes as well as estimate the range of products available and purchased by non-commercial consumers. The results of these studies will supply data for developing regulatory and educational programs to reduce the use of certain pesticides determined to have a detrimental impact on the ecology of watersheds in southern California. Cheryl A. Wilen, Ph.D., UC Statewide IPM Project, directed the overall project.

Key findings from telephone survey:

- Residents of single-family detached homes do most of their own pesticide applications whereas those that rent or own an attached home or apartment will use a commercial company.
- The primary outdoor pest problem in both Delhi and Chollas Creek was ants. However, cockroaches were a more of a problem in Chollas Creek than Delhi Channel. The major secondary pests were snails and slugs.
- Of the respondents that specified products they use to control outdoor pests, the largest proportion (41.3%) used Raid. Diazinon was used by 5.4%.
- The most common formulation of pest control product used was a ready to use aerosol spray (43.5%) followed by a ready to use pump spray (20.9%) and concentrated spray (9.3%). Respondents also indicated using bait, dry granule, traps, and other liquids.
- The majority of survey respondents that have or use pest control products dispose of them by throwing the empty products in the trash. A large proportion (37.2%) also discards products that they no longer use in this manner.

Key findings from mailed survey:

- Over one-quarter of respondents report that they do not read about environmental effects. Many residents also do not read about how or where to store the product nor about effects on human health.
- Respondents preferred to get additional information about pest control from product packaging or products brochures.

- The most frequent pattern of use for pesticide application is once every few months (43.1%), followed by once a month (17.7%), and once a year (16.2%).
- The largest proportion (44.4%) of the products were purchased at Home Depot. The retail store that was reported second most frequently purchased was K-Mart (8.5%).
- Insecticides were the majority of products stored in and around the home. Of the 53 active identified from all the products, 33 were listed as active ingredients on insecticide labels. The most commonly listed active ingredients in insecticides were pyrethrin, imiprothrin, diazinon (14 each), piperonyl butoxide (13), permethrin (12), cypermethrin (11), chlorpyrifos (11), propoxur (10), and tralomethrin (8). Pyrethroids make up the largest class of active ingredients.

Overall recommendations based on the results of this study:

1. Increase consumer awareness of pesticide use and hazards by increasing signage on shelves where pesticides are sold. This signage should be in English and Spanish.
2. Provide more information on the pesticide label. Consumers in this study used the label as the primary source of information. *However, this may be because there is no other information available near the product display.*
3. Increase awareness of locations where residents can dispose of unused pesticides.
4. Since ants are listed as the most important pest that people use pesticide for, develop training, education, and alternatives for control of this pest.
5. Encourage the use and sale of less toxic pest control products and increase the use integrated pest management.

I. INTRODUCTION

In a 1999 study, the US Geological Survey found that common lawn and garden insecticides, particularly diazinon, carbaryl, chlorpyrifos, and malathion, are frequently found in urban streams. The USGS also reported that these insecticides are often found at higher concentrations in urban streams than in agricultural streams (USGS, 1999). Market estimates corroborate these findings. The USEPA estimated that the most common insecticides sold in the lawn and garden market in 1995/1996 were diazinon, chlorpyrifos, and carbaryl. (Aspelin and Grube, 2000).

Two of these pesticides, diazinon and chlorpyrifos, are of primary interest to regulatory agencies and environmental organizations. Diazinon sales for non-agricultural use are scheduled to cease by December 31, 2004 while sales of most products containing chlorpyrifos ended on December 31, 2001. Termiticides containing chlorpyrifos are allowed until December 31, 2005. The sale of these pesticides has been halted because of the health risks to children (USEPA, 1999, USEPA, 2000). There is also evidence that these materials can impair some beneficial uses of water bodies when found at levels which are toxic to certain aquatic organisms (Siepmann and Finlayson, 2000). Previous reports have reviewed the water quality issues related to these pesticides in urban areas of California (Cooper, 1996, Moran, 2001). Although termination of sales of these pesticides will eventually reduce the amount of diazinon and chlorpyrifos entering the waterways, the true effect is likely not anticipated until a number of years later, when the purchased stock is no longer applied in residential areas. In order to accelerate the benefits of limiting sales of diazinon and chlorpyrifos, educational groups and regulatory agencies are implementing programs to provide education to non-commercial applicators and retailers regarding understanding pests and pesticide use and alternatives to diazinon and chlorpyrifos.

To better understand the habits of non-commercial pesticide applicators in the Delhi Channel area of Orange County and the Chollas Creek area of San Diego County, where drainage impacts the Newport Bay and San Diego Bay, respectively, the California Department of Pesticide Regulation contracted with University of California Cooperative Extension (UCCE). The principal investigator, Cheryl A. Wilen, Ph.D., of the U.C. Statewide IPM Project subcontracted the Social Science Research Center at California State University, Fullerton to conduct a telephone and mail survey targeting single-family residences in those areas.

These studies were conducted to determine the self-reported attitudes and behaviors of non-professional pesticide applicators regarding product choice, use, and disposal in and around homes and to estimate the range of products available to and purchased by non-commercial consumers. The resulting data will be used to develop regulatory and educational programs to reduce the use of certain pesticides that have been determined to have a detrimental impact on the ecology of watersheds in Southern California.

In general, the telephone survey was designed to answer the following questions:

- A. Which pests are perceived as the major problems outside of the dwelling,
- B. Which pesticides are used,
- C. How pesticides are selected for use,
- D. How often pesticides are used,
- E. How pesticides are mixed,

- F. Where pesticides are purchased,
- G. How pesticides are disposed of,
- H. Where information regarding pest control is obtained, and
- I. The extent to which users read pesticide labels.

The survey instrument was based on similar surveys conducted previously by U.S. EPA (Whitmore et al., 1992), Maryland Department of the Environment (Kroll and Murphy, 1994), Alameda County, CA (Scanlin and Cooper, 1997), King County, WA (Evans/McDonough Co., 2000), and the San Diego Creek Watershed of Orange County, CA (Wilén, 2001) .

In concert with the telephone survey, a written survey was mailed to interviewees who agreed to provide additional information about the pesticides they used in and around their homes. The focus of this survey was to obtain information regarding:

- A. When the consumer reads the product label
- B. What influences a person's decision to purchase or use a particular product,
- C. Where they would prefer to get pest control information,
- D. How often pesticides are used and where they are disposed of,
- E. Attitudes about pesticides and pest control, and
- F. Which pesticides are stored in and around the homes,

This report identifies educational and regulatory gaps and barriers that influence residential product use by non-commercial applicators. In this context, educational interventions that could be employed to change use patterns are recommended, and regulations that may be needed if education fails are considered. The report also highlights particular constraints to behavioral change. The survey results can be used to prioritize efforts likely to result in the most rapid changes in use and disposal of pesticides. A follow-up study is desirable to quantify the extent of change due to education or regulation.

Description of Regions in this Study

A. Chollas Creek

Chollas Creek is one of the 3 main waterways in the 60 square mile Pueblo watershed, the other two being Paleta Creek, and the San Diego Bay, located in the southwest section of San Diego County. Chollas Creek is considered an urban landscape; nearly all of the land is in residential, retail/office, industrial, or roadway use. The population of the watershed makes it the county's most densely populated watershed with approximately 8,000 residents per square mile.

The watershed drainage consists of small local creeks, both above and belowground and many are concrete-lined. The primary beneficial use impacted by diazinon is acute and chronic toxicity to aquatic life in Chollas Creek. However, because Chollas Creek discharges directly into the San Diego Bay, the beneficial uses which the Bay supports are also affected.

B. Delhi Channel

The Newport Bay watershed is located in Central Orange County encompassing 154 square miles (Strauss, 2002). The Santa Ana-Delhi watershed is approximately 23 square miles within the Newport Bay watershed. The greatest land use in this watershed is residential (37%), roads (23%), and commercial use (17%). There is no agriculture reported for the Santa Ana-Delhi watershed (Source: OCPFRD GIS dept. per Strauss, 2002)

Santa Ana-Delhi Channel is the second largest contributor (~5%) of freshwater into Upper Newport Bay (San Diego Creek is the by far the greatest contributor with 95% of the freshwater flow) (ACOE 2000 per Strauss, 2002). The quality of water flowing from this channel has a downstream effect on the Newport Bay. Impacted areas or uses include a State Ecological Reserve with protected habitat for sensitive species, recreational uses, and commercial and sport fishing (Strauss, 2002)

A large portion of the Delhi channel portion of this survey targeted residents living in the Delhi neighborhood. This is a dense, built-out community of about 500 older housing units housing an estimated 3,500 residents located in the southeast section of the city of Santa Ana. Most of dwellings are single-family homes, but generally have only one or two bedrooms. Approximately 62% are rental units.

Scope of this report:

While pesticides applied to control indoor pests, e.g. roaches, ants, silverfish, spiders, may be contributing to pesticides in the watershed, this study primarily concentrates on the use and disposal of pesticides in an outdoor setting.

Definitions:

“Non-professional applicators” or “Non-commercial applicators” are persons that apply pesticides in their own homes, and “Housing unit” refers to a person’s primary dwelling. “Residential use” or “Home use” refers to pesticides primarily sold to or applied by non-commercial pesticide applicators.

Subcontracting

The Social Science Research Center (SSRC) at California State University, Fullerton was selected to conduct the telephone survey. This group conducted interviews in both English and Spanish and is experienced in conducting surveys pertinent to issues in Orange County. The primary contacts at SSRC were Dr. Gregory Robinson and Ms. Shelley Osborne.

UC COOPERATIVE EXTENSION 2001 PEST CONTROL PRODUCTS SURVEY

II. METHOD

A. Telephone Survey

In November 2001, the Social Science Research Center (SSRC) at California State University, Fullerton conducted telephone interviews in English and Spanish with persons in 1,608 randomly selected households located within the Chollas Creek and Delhi Channel regions of San Diego and Orange Counties, respectively. Of the 1,608 surveys, 787 (48.9%) were completed with residents in the Delhi region of Santa Ana and Costa Mesa and 821 (52.1%) with residents in the Chollas Creek region in San Diego and Lemon Grove.

A total of 1,140 interviews were completed in English and 468 in Spanish or a mix of Spanish and English. Telephone interviews were administered from the SSRC's survey research laboratory, utilizing Computer Assisted Telephone Interviewing (CATI) equipment and software. The CATI system is a sophisticated information gathering protocol that contributes to the accuracy of data and to preserving the random nature of the sample.

Telephone interviews were conducted between November 7th and December 22nd, 2001, Monday through Thursday from 4-9 p.m., and on Saturday and Sunday from 12 p.m. to 8 p.m. The questionnaire consisted of approximately 25 items (see Appendix A) and required from two to 18 minutes to complete, with an average administration time of five minutes and 16 seconds. The average administration time depended upon who in the household assumed primary responsibility for applying outdoor pest control products. Respondents that indicated that no outdoor pest control products were applied at their residences required an average of five minutes and four seconds to complete the survey. Respondents that indicated that an outside company applied pest control products around their households completed the survey in an average time of four minutes and 43 seconds. Respondents that applied products themselves or shared this responsibility with an outside company required an averaged time of five minutes and 50 seconds to complete the survey.

The survey sample was developed in consultation with Scientific Telephone Samples (STS), a proprietary firm specializing in the production of Random Digit Dial (RDD) telephone samples. The sample was constructed in proportion to the number of households within each of eight Zip Codes falling within watershed boundaries. If potential respondents declined to provide their Zip Code, they were not included in the study. After one month of interviewing, respondents that resided in apartments were disqualified from participating in the telephone survey. This decision was based on the small proportion of apartment dwellers that were able to provide information regarding the pest control products applied at their residences, since application of these products is typically the responsibility of the complex manager and that they were unlikely to apply pesticides to the areas outside of their apartments.

The sample frame consisted of both listed and unlisted, long- and recently- established telephone numbers from all households within the designated zip codes. Every household in this area with a telephone had an equal non-zero chance of being selected to participate in the study. The telephone company estimates that the penetration of phone lines in residential households in Orange County is

98.5%. The U.S. Census Bureau estimates that 98.9% of households in San Diego County have telephone service. It is our belief that no major events occurred during the interview period that might have affected responses to the survey items.

To complete 1,608 interviews, 65,272 individual dialing attempts were made to about 8,450 unique telephone numbers. About 20% (19.6%) of the interviews were completed on the first attempt, 16.9% on the second, 13.2% on the third attempt, 9.8% on the fourth call, 8.0% on the fifth call and 32.5% on the sixth or higher attempt. This persistence paid off in a response rate of approximately 65%. The final disposition of each unique telephone number attempted is depicted below.

Table 1. Final dispositions for sample records in telephone survey.

Completes	1,608
No Answer	1,000
Busy	137
Answering Machine/ Voice Mail	545
Phone Disconnect	1,624
Fax Machine	302
Incoherent	43
Not a Residence	945
Spanish Language Callback	18
Other Language Callback	40
Other Language Spoken in Home	37
Teenager Phone	23
Qualified Refusal	123
Unqualified Refusal	477
Qualified Callback	6
Unqualified Callback	241
Not Qualified	1,265
Not Available Project Dates/ Hours	17
Call Blocked	2
Total Sample	8,453

Initially, (from November 7th until December 5th), qualification for the survey was based solely upon Zip Code. After reviewing these preliminary data, we found that a large proportion of respondents that live in apartments do not apply outdoor pest control products. Consequently, no additional apartment dwellers were included in the survey. Beginning on December 6, 2001, residents that indicated that they lived in an apartment were thanked for their willingness to complete the survey, and the call was ended.

B. Mail Survey

At the conclusion of the telephone survey, respondents that resided in single-family detached homes were asked if they would be willing to receive a mailed survey soliciting more detailed information about their use and disposal of pest control products. The mailed survey included questions regarding what respondents look at on a pest control label, the factors that determine their choice of which product to purchase, and where they get their pest control information. In addition, respondents were asked to

provide detailed information on every pest control product stored either in or around their home. This included the name, active ingredient, size, form, age of the product, where they purchased it and where they store it. Respondents were informed that they would receive a telephone calling card worth 60 minutes of national telephone time if they completed and returned the survey. Of the 905 residents in single-family homes, 488 (53.9%) agreed to participate in the mailed “home inventory” survey (209 (42.8%) in Delhi and 279 (57.2%) in Chollas Creek).

SSRC interviewers telephoned all non-respondents to inquire about the status of the mailed surveys. If respondents refused to participate in the survey during the follow-up telephone call, no further contact was attempted and a second copy of the survey was not sent. Five respondents were not sent a second copy of the survey because the contact person was now deceased, or the resident that completed the telephone survey was moving or had already moved out of the area. All other non-respondents were mailed a second copy of the survey. Follow-up calls were again made to non-respondents at which time residents were asked to complete and return the in-home inventory.

Despite follow-up phone calls and a second mailing, of the 488 residents that received the mailed questionnaire, just 133 (27.3%) completed and returned it (63 (47.4%) residents in the Delhi region and 70 (52.6%) in Chollas Creek). This low rate of return can be attributed to several factors. First, respondents may have been surprised at the level of detail requested on the “home inventory” surveys. In addition, the home inventory surveys were mailed close to the Thanksgiving, Hanukkah and Christmas Holidays

C. Presentation of Survey Results

Telephone survey respondent demographics, including regional differences in survey responses, are presented first, followed by outdoor pest problems, and indoor pest problems. The next major section compares demographics between RDD telephone survey respondents either qualified or unqualified to complete the mailed survey and compares respondents in three categories denoting their mailed survey status (completed the mailed survey, requested but did not return the mailed survey, and declined to receive the mailed survey). The last section details results of the mailed survey.

D. Analysis Methodology

Pearson Chi-Square Analyses

Throughout this report, the Pearson chi-square test is used to examine the relationship between two categorical variables (e.g. respondent race/ethnicity and region of residence). In this case, if no relationship exists between the two variables, we would expect to find approximately equal numbers of individuals falling into each of the ten classification cells (two regions multiplied by five racial/ ethnic categories). Where there are differences, use of the Pearson chi-square test allows us to determine if the observed differences are statistically significant. Utilizing the convention of an alpha value of .05, statistical significance refers to the probability that the observed relationship may occur by chance or random error *less than one in twenty times*.

III. TELEPHONE SURVEY RESULTS

RESPONDENT DEMOGRAPHICS

Gender

At the conclusion of each survey, interviewers coded respondent gender. Of the 1,608 completed interviews, 759 respondents were female (47.2%) and 846 were male (52.6%). Interviewers were unable to determine the gender of three respondents by voice alone. The proportions of males and females in the two regions (Delhi and Chollas Creek) that completed the telephone survey do not differ significantly.

Age

Respondents averaged approximately 40 years of age. The median age was 38. As depicted in the table below, there were more respondents in the 18 to 30 (34.1%) and 31 to 40 (26.2%) age groups than in others. The smallest group consisted of respondents between 51 and 60 years of age (11.1%). One hundred thirty-five respondents (8.4%) declined to state their age. Respondent age was not significantly different between residents of the Delhi region in Orange County and Chollas Creek residents in San Diego County.

Table 2. Age of respondents.

Age	Frequency	Percent
18 to 30	503	34.1%
31 to 40	386	26.2%
41 to 50	247	16.8%
51 to 60	163	11.1%
61 to 95	174	11.8%
Declined to state	135	(omitted from total)
Total	1,608	100.0%

Race/Ethnicity

As depicted by Table 3 on the following page, the largest racial/ethnic group is Hispanic/ Latino (44.6%), with Caucasian/ White comprising the second largest ethnic group (37.0%). Seventy-two of 1,608 respondents (4.5%) refused to disclose their racial/ethnic background.

Survey respondents who self-identified as Asian were asked to specify their race. Of the 92 Asian respondents, 22 (23.9%), indicated that they were Filipino, 11 (12.0%) Vietnamese, ten (10.9%) Chinese and eight (8.7%) Laotian. Responses also included Japanese, Korean, Pacific Islander, and Asian Indian. Twelve of the 22 respondents (54.5%) that specified their race/ethnicity as “other” self-identified as Bi- or Multi-Racial, and nine (40.9%) of the “other” racial/ ethnic category as Native American.

Table 3. Race or ethnicity of respondents.

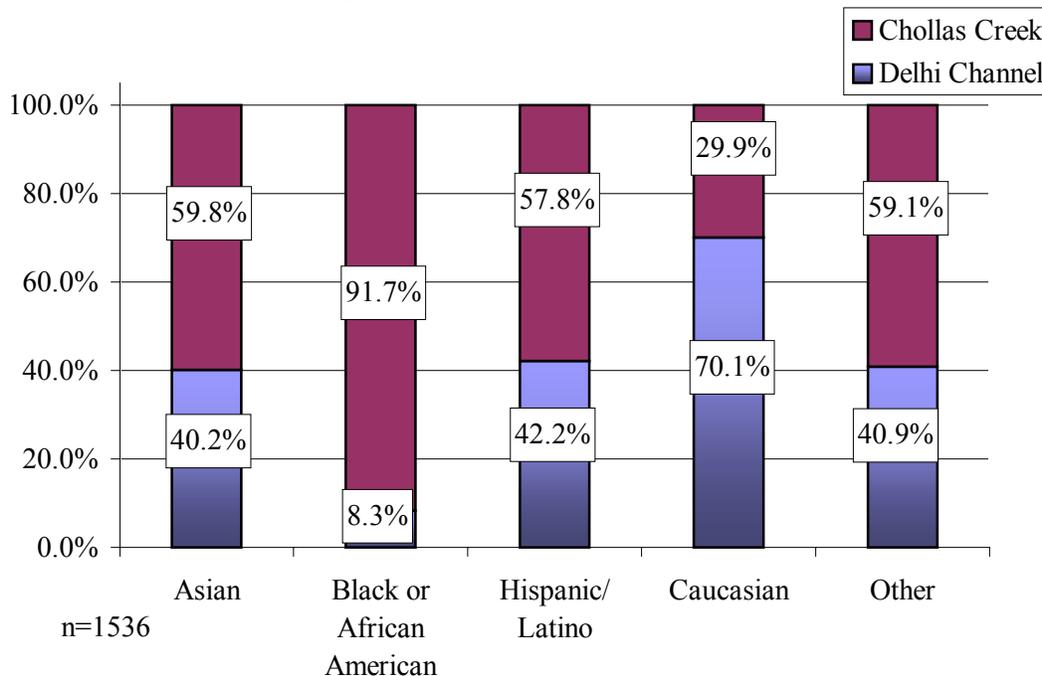
Race/Ethnicity	Frequency	Percent
Hispanic or Latino	685	44.6%
Caucasian or White	568	37.0%
Black or African American	169	11.0%
Asian	92	6.0%
Other Race/Ethnic Group	22	1.4%
Declined to state	72	(omitted from total)
Total	1,608	100.0%

Race/Ethnicity and Region

Significant differences in race/ethnicity by region are depicted below (Figure 1). Note that 70.1% of the Caucasian telephone survey respondents reside in the Delhi region, whereas 155 (91.7%) of the African-American respondents reside in the Chollas Creek region. Proportions of residents in the five major racial/ ethnic categories are significantly different by region ($\chi^2 = 229.15, p < .001$).

In this analysis, the chi-square test is used to determine if proportions of residents in each racial/ ethnic category are significantly different between the two regions. If they did not differ, each pair of red and blue bars in the graph above would be of approximately equal height. Note that a statistically significant result does not imply significant differences by region in each of the five respondent racial/ ethnic categories. Instead, statistical significance reflects an overall difference between regions in the relative distribution of “observations” (respondents) in all five racial/ ethnic categories.

Figure 1. **Respondent Race/Ethnicity by Region**



Primary Language Spoken at Home

Of the 1,581 valid responses, the majority (60.0%) of respondents indicated that the primary language spoken in their home was English, followed by 564 (35.7%) who speak Spanish. All survey responses are presented in Table 4 below.

Table 4. Primary language spoken.

	Frequency	Percent
English	949	60.0%
Spanish	564	35.7%
Vietnamese	13	.8%
Mix of Spanish and English	10	.6%
Laotian	9	.6%
European Language	7	.4%
Other	26	1.6
Total	1581	100.0%

Other responses included Tagalog, Filipino, and other Asian languages.

Primary Language Spoken at Home and Region

Of the 787 Delhi residents, 593 (75.3%) indicated that they primarily speak English at home and 194 (24.7%) speak Spanish. Of the 821 Chollas Creek residents, 547 (66.6%) speak English at home and 274 (33.4%) speak Spanish. These regional differences are statistically significant ($\chi^2 = 14.82$, $p < .001$).

Race/Ethnicity and Primary Language Spoken at Home

Respondent race/ ethnicity and primary language spoken at home were combined to form a single variable to examine differences between English speaking Latino, Spanish speaking Latino, Caucasian, African-American, and Asian respondents. There were too few Asian respondents in the sample to make comparisons between English-speaking and Asian-speaking respondents. Table 5 on the following page details this new variable. Respondents that were classified as “other” race/ethnicity, or did not provide this information, and respondents that did not provide the language they speak at home are excluded. As depicted in the table on the following page, the largest proportion (37.9%) of respondents are Caucasian, followed closely by 557 (37.1%) Spanish-speaking Latinos.

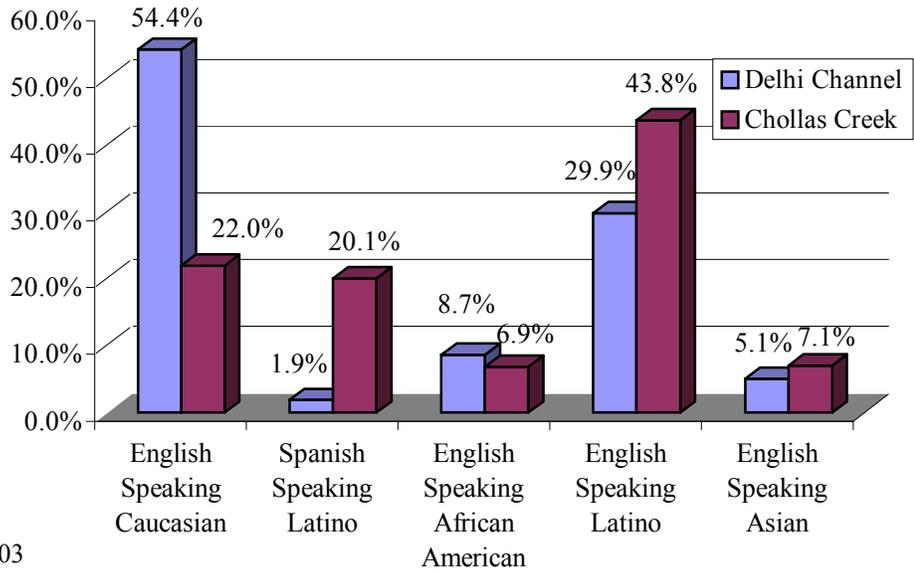
Table 5. Race/Ethnicity and language spoken.

	Frequency	Percent
English Speaking Caucasian	568	37.9%
Spanish Speaking Latino	557	37.1%
English Speaking African American	169	11.2%
English Speaking Latino	117	7.8%
English Speaking Asian	92	6.1%
Total	1,503	100.0%

Race/Ethnicity and Primary Language Spoken at Home and Region

As depicted by Figure 2, 54.4% of Delhi residents are English-speaking Caucasians, compared to 22.0% of Chollas Creek residents. Less than 2% of Delhi residents are Spanish-speaking Latinos, compared to 20.1% of Chollas Creek residents. Approximately 30% of Delhi residents are English-speaking Latinos, compared to 43.8% of residents in Chollas Creek. These differences are statistically significant ($\chi^2 = 238.29$, $p < .001$).

Figure 2. **Race/ Ethnicity and Primary Language Spoken at Home and Region**



Total Annual Household Income

The largest proportion of the sample (24.0%) reported earning between \$25,000 and \$44,999 annually. The second largest proportion (20.9%) reported earning less than \$15,000. A total of 447 respondents (27.8% of the total sample) either did not know or declined to state their total annual household income. The percentages in Table 6 below are computed based upon valid replies.

Table 6. Total annual household income.

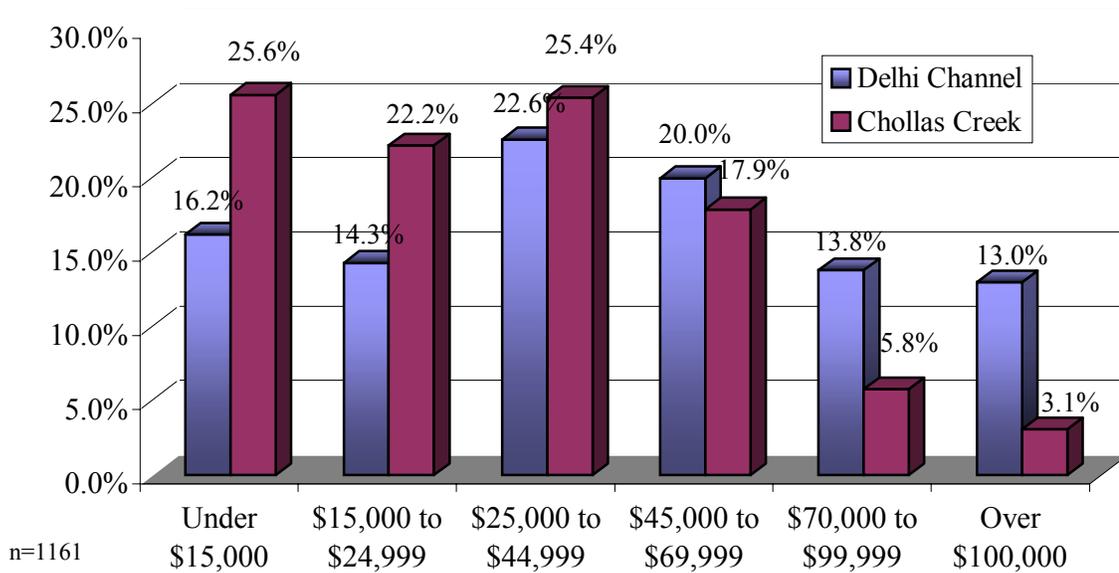
	Frequency	Percent
Less than \$15,000	243	20.9%
Between \$15,000 and \$24,999	212	18.3%
Between \$25,000 and \$44, 999	279	24.0%
Between \$45,000 and \$69, 999	220	18.9%
Between \$70,000 and \$99,000	114	9.8%
\$100,000 and above	93	8.0%
Total	1,161	100.0%

Total Annual Household Income and Region

As shown in the Figure 3, the largest proportion (25.6%) of respondents in Chollas Creek report earning less than \$15,000 per year, with slightly fewer (25.4%) reporting an annual income between \$25,000 and \$44,999. The largest proportion (22.6%) of respondents in Delhi Channel report earning between \$25,000 and \$44,999 per year, followed by 20% than earn between \$45,000 and \$69,999. These income differences are statistically significant ($\chi^2 = 77.61, p. < .001$).

Over one-quarter of Chollas Creek residents report earning less than \$15,000 per year. The largest proportion of respondents in Delhi Channel report earning between \$25,000 and \$44,999 per year. Approximately 47% of Delhi residents earn \$45,000 or more annually, compared to 27% of Chollas Creek residents.

Figure 3. **Respondent Income by Region**



City of Residence

As indicated by Table 7 below, the largest proportions of the sample reside in the cities of San Diego (49.3%) and Costa Mesa (36.3%). These are followed by 203 respondents (12.6%) in Santa Ana, and 29 (1.8%) in Lemon Grove

Table 7. City of residence of respondents.

	Frequency	Percent
San Diego	792	49.3%
Costa Mesa	584	36.3%
Santa Ana	203	12.6%
Lemon Grove	29	1.8%
Total	1,608	100.0%

Level of Education

As depicted in Table 8, of the 1,540 survey respondents who supplied an answer, just over one-quarter (25.5%) reported having less than a high school degree, followed by 23.9% that reported having completed some college, and 22.9% that reported obtaining a high school degree. Sixty-eight survey respondents did not provide an answer.

Table 8. Highest level of education completed.

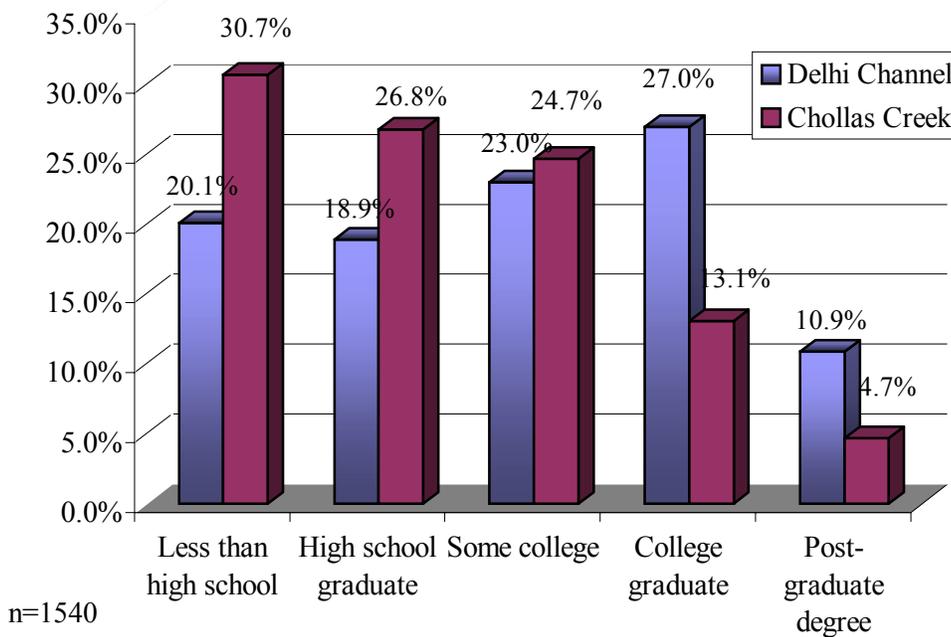
	Frequency	Percent
Some high school or less	393	25.5%
High school graduate	353	22.9%
Some college	368	23.9%
College graduate	307	19.9%
Post-graduate degree	119	7.7%
Total	1,540	100.0%

Overall, approximately one-quarter of survey respondents report having less than a high school education (25.5%), graduating high school (22.9%) or completing some college (23.9%); however, regional differences are statistically significant.

Level of Education and Region

As indicated by Figure 4, residents of the Delhi Channel watershed are better educated than their counterparts in San Diego. Close to 31 percent (30.7%) of the respondents that reside in Chollas Creek indicated that they have less than a high school degree, compared to 20.1% of Delhi residents. Just over 13 percent (13.1%) of Chollas Creek residents indicated that they completed a college degree, compared to 27.0% of the residents of the Delhi region. All valid survey responses are presented in the graph on the next page. These differences are statistically significant ($\chi^2 = 83.65, p. < .001$).

Figure 4. **Respondent Educational Attainment by Region**



Type of Residence

The distribution of responses for residents that completed the survey prior to December 6th is presented in the leftmost columns in Table 9. The columns to the right in Table 9 depict the final distribution of all survey respondents (see Methods section for more information).

As indicated by Table 9, over one-half (51.4%) of the respondents that completed surveys prior to December 6th report living in a single family detached home and 457 (34.5%) reside in an apartment. After residents that reside in apartments were disqualified from completing the survey, the proportion of residents in single-family detached homes rose to 56.5% and the final, overall proportion of residents in apartments dropped to 29.1%.

Table 9. Type of residence.

	Interviews Completed Before December 6, 2001		All survey respondents	
	Frequency	Percent	Frequency	Percent
Single-family detached home	680	51.4%	905	56.5%
Attached home	146	11.0%	182	11.4%
Apartment	457	34.5%	467	29.1%
Mobile home	32	2.4%	38	2.4%
Other	8	.6%	11	.7%
Refused	4	Omitted	5	Omitted
Total	1323	100.0%	1,608	100.0%

Home Ownership

Forty-nine respondents did not reply to a question concerning ownership of their residence. Of the 1,559 respondents who supplied an answer, 713 (45.7%) reported that they own their residence, while 846 (54.3%) reported that they rent. The proportion of residents that own their residence was not statistically different between the two survey regions.

For analytic purposes, type of residence and home ownership were combined to create a new variable. Table 10 below presents the distribution of responses on this combined variable, omitting respondents who did not answer one or both of the original questions. The largest proportion (37.6%) of residents reported that they own single-family detached homes, followed by 455 (29.3%) that rent an apartment. The small number of respondents that reported owning or renting a mobile home, owning an apartment, or owning or renting something else (such as a boat) were omitted from the analysis.

Table 10. House type/ ownership.

	Frequency	Percent
Own a single family detached home	585	37.6%
Own an attached home	88	5.7%
Rent a single family detached home	282	18.1%
Rent an attached home	90	5.8%
Rent an apartment	455	29.3%
Other	55	3.5%
Total	1,555	100.0%

Home Ownership and City of Residence

As illustrated by Table 11, the largest proportion of respondents in all cities except Costa Mesa currently own a single-family detached home. The largest proportion (34.2%) of respondents in Costa Mesa currently rent an apartment. Over two-thirds of the respondents in Lemon Grove (67.9%) currently own a single-family detached home, while none of the residents reported that they own or rent an attached home. Regional totals for Delhi and Chollas Creek are presented in the shaded columns. These differences between city of residence and home ownership are statistically significant ($\chi^2 = 54.275$, $p < .001$).

There are significant differences between city of residence and home ownership. Almost 68% of Lemon Grove residents own a detached house, compared to 45% of Santa Ana residents, 41% in San Diego and 33% in Costa Mesa.

Table 11 Home ownership (row) by City of residence (column).

	Costa Mesa	Santa Ana	Delhi Region	Lemon Grove	San Diego	Chollas Creek Region
Own Detached home	182 (33.3%)	87 (45.1%)	269 (36.4%)	19 (67.9%)	297 (40.6%)	316 (39.0%)
Own Attached Home	46 (8.4%)	11 (5.7%)	57 (7.7%)	0	31 (4.2%)	31 (4.1%)
Rent Detached Home	82 (15.0%)	43 (22.3%)	125 (16.9%)	5 (17.9%)	152 (20.8%)	157 (20.7%)
Rent Attached Home	50 (9.1%)	6 (3.1%)	56 (7.6%)	0	34 (4.6%)	34 (4.5%)
Rent Apartment	187 (34.2%)	46 (23.8%)	233 (31.5%)	4 (14.3%)	218 (29.8%)	222 (29.2%)
Total	547 (100.0%)	193 (100.0%)	740 (100.0%)	28 (100.0%)	732 (100.0%)	760 (100.0%)

APPLICATION OF OUTDOOR PRODUCTS

Who Applies Outdoor Pest Control Products?

All survey respondents were asked, “Who at your residence applies outdoor pest control products?” and were read the options depicted in Table 12. As shown in the table, the largest proportion of survey respondents (37.4%) indicated that they are responsible for outdoor pest control product application. This was followed by 484 (30.1%) respondents that indicated that a commercial company, apartment complex or home owners association not directly contracted by them is responsible for outdoor pest control product application.

Table 12. Who applies outdoor pest control products.

	Frequency	Percent
Yourself	601	37.4%
Another Member of the household	46	2.9%
Commercial Co., Apt. Complex or Home Owners Association	484	30.1%
Yourself and a pest control company	48	3.0%
Only a pest control company	39	2.4%
No outdoor pest control products are applied	269	16.7%
Other	51	3.2%
Don't know/ No Response/ Refused	70	4.4%
Total	1608	100.0%

Thirty-four (66.7%) of the 51 respondents whose answers were classified as “other” indicated that the property owner or landlord was responsible for applying outdoor pest control products. Other responses included the city, gardener, and the senior home where the respondent resides.

Approximately 37% of respondents indicated that they are responsible for outdoor pest control product application, 30% reported that an outside company, apartment complex or homeowners association is responsible and approximately 17% indicated that no pest control products are applied at their residences.

For some analyses, the “who applies” classifications above were combined into four categories: Commercial Applicator, Home Application, Commercial Applicator and Home Application, and No application of outdoor pest control products. Respondents that indicated that a commercial company, apartment complex or home owner’s association (n=484) or that only a pest control company (n=39) applied pest control products are labeled “Commercial Application”. Respondents that indicated that they (n=601) or another member of their household (n=46) are responsible for pest control application are labeled “Home Application”. The 48 respondents that indicated that they shared this responsibility with a pest control company were so categorized, as illustrated by Table 13.

Table 13. Who applies outdoor products –combined data.

	Frequency	Percent
Home application (respondent or another member of household)	647	43.5%
Commercial Application (Commercial Co., Apt. Complex, Homeowners Assoc., Contracted Company)	523	35.2%
Home and Commercial Application (Respondent and a pest control company)	48	3.2%
No outdoor pest control products are applied	269	18.1%
Total	1487	100.0%

Who Applies Products and Residence Type/ Ownership

As depicted in Table 14, the largest proportion (62.4%) of survey respondents that currently own a single-family detached home report that someone within their household applies outdoor pest control products. The largest proportion of residents that own an attached home (54.1%) or that rent an attached home (53.2%) report that an outside company is responsible for product application. Similarly, 313 (74.3%) residents that rent an apartment report that an outside company is responsible for product application. Among survey respondents that rent a single-family detached home, the greatest proportion of respondents (53.6%) report home application of products at their residence. The relationship between “Who applies pest control products” and “Residence Type/ Ownership” is statistically significant.

Table 14. Who applies outdoor pest control products (row) by Residence Type/ Ownership (column).

	Own a Single-Family Detached Home	Own an Attached Home	Rent a Single-Family Detached Home	Rent an Attached Home	Rent an Apartment
Home application	353 (62.4%)	23 (27.1%)	128 (53.6%)	24 (30.4%)	71 (16.9%)
Outside Company	56 (9.9%)	46 (54.1%)	43 (18.0%)	42 (53.2%)	313 (74.3%)
Home and Company	30 (5.3%)	4 (4.7%)	6 (2.5%)	2 (2.5%)	3 (.7%)
No outdoor pest control products are applied	127 (22.4%)	12 (14.1%)	62 (25.9%)	11 (13.9%)	34 (8.1%)
Total	566 (100.0%)	85 (100.0%)	239 (100.0%)	79 (100.0%)	421 (100.0%)

p. < .001

Residents of single-family detached homes do most of their own pesticide applications whereas those that rent or own an attached home or apartment will use a commercial company.

While 8.1% of the respondents that live in an apartment stated that no outdoor pest products are applied at their complex, that number may be misleading. They may not *be aware* of any applications since they have little or no control over when and why these applications are done.

Who Applies Products and Region

As depicted in Table 15 below, the proportion of respondents that report home application (42.9% and 44.1%) or home and company application (3.1% and 3.4%) of pest control products differ only slightly between residents of the Delhi region of Santa Ana/ Costa Mesa and residents of the Chollas Creek region of San Diego/ Lemon Grove. Larger differences between regions are seen in the proportions of Delhi residents (39.0%) and Chollas Creek residents (31.6%) that report outside company application. Although the differences are slight, the relationship between region and who applies products is statistically significant.

Table 15. Who applies outdoor pest control products (row) by Region (column).

Who applies outdoor products	Delhi Channel	Chollas Creek
Home application	309 (42.9%)	338 (44.1%)
Outside Company	281 (39.0%)	242 (31.6%)
Home and Company	22 (3.1%)	26 (3.4%)
No outdoor pest control products are applied	109 (15.1%)	160 (20.9%)
Total	721 (100.0%)	766 (100.0%)

p. < .01

OUTDOOR PEST PROBLEMS

Main Outdoor Pests

Respondents were asked about the main outdoor pests they encounter around their residences. Forty-two respondents did not provide a response and 433 (26.9% of the entire sample) reported that they do not have any outdoor pest problems. As depicted by Table 16, over one-half (52.9%) of the 1,133 respondents that supplied an answer reported ants to be their major outdoor pest problem. This was followed by 90 (7.9%) that identified cockroaches, 83 (7.3%) that reported animals (such as rats, mice, opossums, and gophers), 54 (4.8%) that reported snails and slugs, and 53 (4.7%) that reported spiders. The top ten responses are reported in Table 16 below and encompass 92.6% of all responses.

Table 16. Primary outdoor pests.

Top Ten Main Outdoor Pest Problems	Frequency	Percentage
Ants	599	52.9%
Cockroaches	90	7.9%
Animals	83	7.3%
Snails and Slugs	54	4.8%
Spiders	53	4.7%
Fleas	36	3.2%
Termites	36	3.2%
Whiteflies	33	2.9%
Unspecified Insects	33	2.9%
Flies	32	2.8%

Main Outdoor Pests and Region

A crosstabulation was performed to examine the relationship between the top ten outdoor pests reported by respondents and region. Although there were significant differences, as presented in Table 16A on the following page, the proportions differ only slightly between residents of the Delhi Channel and Chollas Creek regions. The largest difference is the proportion of residents that reported cockroaches as a main outdoor pest problem. Thirty-two (6.0%) residents in Delhi Channel reported that cockroaches are an outdoor pest problem, compared to 58 (10.9%) Chollas Creek residents.

Table 16A. Primary outdoor pest problems (row) by region (column).

Top Ten Outdoor Pest Problems and Region	Delhi Channel	Chollas Creek
Ants	311 (59.5%)	288 (54.8%)
Cockroaches	32 (6.1%)	58 (11.0%)
Animals	36 (6.9%)	47 (8.9%)
Snails and Slugs	28 (5.4%)	26 (4.9%)
Spiders	34 (6.5%)	19 (3.6%)
Fleas	11 (2.1%)	25 (4.8%)
Termites	25 (4.8%)	11 (2.1%)
Whiteflies	19 (3.6%)	14 (2.7%)
Unspecified Insects	15 (2.9%)	18 (3.4%)
Flies	12 (2.3%)	20 (3.8%)

p. < .001

Over one-half of survey respondents reported ants to be their major outdoor pest problem. Regional differences are statistically significant, but proportions differ only slightly. Thirty-two (6.0%) residents in Delhi Channel reported that cockroaches are an outdoor pest problem, compared to 58 (10.9%) Chollas Creek residents.

Products Used to Control Main Outdoor Pest Problem

Of the 1,134 respondents that reported having an outdoor pest problem, 241 (21.3%) were not able to name the pest control product they use to control it. One hundred eighty-nine (21.2%) respondents could not identify the product used to control their main outdoor pest problem because a pest control company, their apartment complex, or their homeowner’s association applied the product. Approximately 21% (n=188) indicated that they do not use any pest control products around their residence. Of the 516 respondents that specified a product, the largest proportion (41.3%) used Raid followed by 35 (6.8%) that used an unidentified Ortho Product and 35 (6.8%) that used a non-chemical product such as water, soap and water, salt, baby powder and coffee grounds. Black Flag was used by 5.6% of respondents and Diazinon was used by 5.4%. About 12% reported a product that could not be categorized; these answers included bleach, “409”, “Borax”, and “Rescue”.

There was not a statistically significant difference between the products used to control residents' main outdoor pest problems and region.

Form of Pest Control Product

Table 17 below details the form of the 516 products used by survey residents to control their outdoor pest control problem. The most common form of pest control product used was a ready to use aerosol spray (43.5%) followed by a ready to use pump spray (20.9%) and concentrated spray (9.3%). Respondents also indicated using bait, dry granule, traps, and other liquids.

The relationship between the form of the product used to control the main outdoor pest problem and region was not statistically significant.

Table 17. Form of outdoor pest control product.

Product Form	Frequency	Percent
Ready-to-use aerosol spray	221	43.5%
Ready-to-use pump spray	106	20.9%
Concentrated spray	47	9.3%
Dry granule	41	8.1%
Bait	29	5.7%
Traps/ Boxes	12	2.3%
Liquid (Includes bleach, drops, etc.)	12	2.3%
Water or Soap and Water	9	1.8%
Other	31	6.0%
Don't Know or Refused	8	Omitted from total
Total	516	100.0%

Other responses included chalk, gun, pellets, powder, and stakes.

Other Outdoor Pests

The 1,134 respondents that reported a main outdoor pest problem were asked if they experienced problems with any other pests around their residence. Of the 1,108 respondents that provided an answer, 442 (39.9%) reported that they had additional pest problems. As presented in Table 18 on the next page, the most common other outdoor pest problem reported by respondents was snails or slugs, followed by 64 (14.5%) respondents that reported ants, 43 (9.7%) spiders, 40 (9.0%) weeds, and 37 (8.4%) animals. Table 18 details the eleven most frequent responses. A total percentage is not included since respondents could report up to four separate additional pests.

Table 18. Other outdoor pests.

Top Eleven Other Outdoor Pest Problems	Frequency	Percentage
Snails and Slugs	159	36.0%
Ants	64	14.5%
Spiders	43	9.7%
Weeds	40	9.0%
Animals	37	8.4%
Whiteflies	34	7.7%
Insects- unspecified	32	7.2%
Cockroaches	23	5.2%
Termites	11	2.5%
Flies	10	2.3%
Fleas	8	1.8%

APPLICATION OF INDOOR PRODUCTS

Who Is Responsible For Indoor Pest Control?

Regardless of who at their residence applies outdoor products, respondents were asked who is responsible for indoor pest control at their residence. Of the 1,580 that answered the question, 366 (23.2%) indicated that no indoor pest control products are applied in their household. Over one-half (56.8%) of the survey respondents indicated that they were responsible for indoor pest control. This was followed by 174 (11.0%) respondents that indicated that a commercial company, apartment complex or homeowners association applies pest control products. Table 19 on the following page details these results. The relationship between who is responsible for the application of indoor pest control products and the region the respondent lives in is not statistically significant.

Table 19. Who applies indoor products.

	Frequency	Percent
Yourself	897	56.8%
No Pest Control Products are Applied	366	23.2%
Commercial Co., Apartment Complex or Home Owners Association not Directly Contracted by You	174	11.0%
Another Member of Your Household	65	4.1%
Only a Pest Control Company that you Contract with Directly	29	1.8%
Yourself and a Pest Control Company that you Contract with Directly	27	1.7%
Property Owner/ Landlord	16	1.0%
Senior Home	6	0.4%
Total	1,580	100%

INDOOR PEST PROBLEMS

Main Indoor Pest Problem in Residence

Respondents were asked what they considered to be the main indoor pest problem in their residences. The largest proportion of respondents reported that they did not have an indoor pest problem (n=593, 37.5%) and 28 respondents (1.7%) did not know or refused to answer the question. As presented in Table 20 on the following page, the largest proportion (44.6%) of respondents that specified a problem reported ants to be their main indoor pest. This was followed by 284 (28.8%) that reported cockroaches and 86 (8.7%) spiders. The top ten responses, which account for 97.7% of all responses, are presented in Table 20.

Table 20. Main Indoor Pest Problems in Residence.

Top Ten Indoor Pest Problems	Frequency	Percent
Ants	440	44.6%
Cockroaches	284	28.8%
Spiders	86	8.7%
Animals	44	4.5%
Termites	34	3.4%
Fleas	26	2.6%
Flies	22	2.2%
Insects – unspecified	19	1.9%
Waterbugs	10	1.0%

Main Indoor Pest Problem in Residence and Region

As presented in Table 21 below, over one-half (55.2%) of the residents in the Delhi Channel region reported ants to be their major indoor pest problem compared to 36.0% of the respondents in the Chollas Creek region. Just under 19% of residents in Delhi reported cockroaches to be a major indoor pest problem compared to 40.0% of Chollas Creek residents. These differences between regions are statistically significant ($\chi^2 = 71.15, p. < .001$).

Table 21 The nine most reported indoor pest problems (row) by region (column).

Top Nine Indoor Pest Problems and Region	Delhi Channel	Chollas Creek
Ants	266 (55.2%)	174 (36.0%)
Cockroaches	91 (18.9%)	193 (40.0%)
Fleas	15 (3.1%)	11 (2.3%)
Flies	11 (2.3%)	11 (2.3%)
Spiders	52 (10.8%)	34 (7.0%)
Termites	21 (4.4%)	13 (2.7%)
Waterbugs	3 (.6%)	7 (1.4%)
Unspecified Insects	10 (2.1%)	9 (1.9%)
Animals	13 (2.7%)	31 (6.4%)

p. < .001

Ants are the main indoor pest problem for the largest proportion of survey respondents. Whereas only 8% of respondents identified cockroaches as their main outdoor pest problem, 30% of respondents reported them to be their main indoor pest problem. Residents of the two regions experience different pest problems in their homes.

Product Used to Control Main Indoor Pest

Of the 987 respondents that reported having an indoor pest problem, 125 (12.7%) were not able to provide the name of the product that they used to control it. Of the remaining 862 that reported a pest problem, 84 (9.7%) reported that a pest control company, their apartment complex, or their homeowner's association applied the product, and 117 (13.6%) indicated that they do not use any pest control products

in their residence. Of the 661 respondents that specified a product, over one-half (53.1%) used Raid followed by 42 (6.4%) that used Black Flag and 42 (6.4%) that used a non-chemical product. Seventy-three (11.0%) respondents reported a product that could not be categorized; these answers included bleach, “WD-40”, “My Track”, “Pest Zap”, “Sonic Pest Control”, and hairspray. The top ten responses are presented in Table 22 below and account for 84% of all responses.

The relationship between the product used to control the main indoor pest problem and region was not statistically significant.

Table 22. Indoor pest control products.

Indoor Product	Frequency	Percent
Raid	351	53.1%
Black Flag	42	6.4%
Non Chemical	42	6.4%
Combat	36	5.4%
Unspecified spray	27	4.1%
Ortho	15	2.3%
Boric Acid	13	2.0%
Hot Shot	11	1.7%
Rat traps	10	1.5%
Diazinon	7	1.1%

Indoor Pest Control Product Form

In addition to naming the product used indoors, respondents were also asked what form of the product they used. Twelve respondents did not provide an answer to this question. Of the 649 that could identify the form of the product they used, the majority used a ready-to-use aerosol spray (n=342, 52.7%), followed by 115 (17.3%) that used a ready-to-use pump spray, and 44 (6.8%) that used bait. The top ten responses are listed in Table 23 on the following page. These account for approximately 92.6% of all responses. **The top three account for over three-quarters of the responses.**

The relationship between the product form used to control the main indoor pest problem and region was not statistically significant.

Table 23. Form of product used.

Indoor Product	Frequency	Percent
Ready-to-use aerosol spray	342	52.7%
Ready-to-use pump spray	112	17.3%
Bait	44	6.8%
Packages	22	3.4%
Dry Granule	18	2.8%
Traps/ boxes	17	2.6%
Gel/glue-like, cream, tar-like	13	2.0%
Liquid (includes bleach & drops)	12	1.8%
Concentrated spray	11	1.7%
Powder	10	1.5%

PRODUCT DISPOSAL

Disposal of Products That You No Longer Use

One hundred and thirty-seven respondents indicated that neither outdoor nor indoor pest control products were applied at their residence. These respondents were not asked about the disposal of products that they no longer use. Ninety-six respondents did not answer this question. Of the 1,375 respondents that provided a response, 309 (22.5%) indicated that they do not have or use any pest control products. Of the 1,066 survey respondents that have and/or use pest control products, the largest proportion (44.7%) reported that they dispose of pest control products that they no longer use by finishing the product and then throwing it in the trash, followed by 397 (37.2%) that throw unused products in the trash and 82 (7.7%) that reported that they take unused products to a hazardous waste disposal site. These responses are detailed in Table 24 on the next page. There are no significant differences between respondents in the two regions.

The majority of survey respondents that have or use pest control products dispose of them by throwing the empty products in the trash. A large proportion (37.2%) also discards products that they no longer use in this manner. Regional differences are not statistically significant.

Table 24. Method of product disposal.

Disposal of Products You No Longer Use	
Finish the product, then throw it in the trash	476 (44.7%)
Put in the trash	397 (37.2%)
Take to hazardous disposal site	82 (7.7%)
Stores products – does not dispose of them	21 (2.0%)
Recycling Center	18 (1.7%)
Pour down drain or toilet inside	17 (1.6%)
Outside company, apartment complex, or homeowners association disposes of products	17 (1.6%)
Other	38 (3.6%)

Other responses included give the product away and follow the directions on the label.

IV. IN-HOME MAILED SURVEY RESULTS

In this section, the results of the mailed surveys are described. The mailed survey was seven pages in length and consisted of approximately 58 items plus the home inventory survey (see Appendix B). Respondents were asked to answer eight questions for each unique pest control product stored in or around their residences. These home inventory items are presented last.

PACKAGING AND CHOICE OF PRODUCT

Pest Control Packaging

Respondents were asked about reading elements on the labels of pest control packaging. Not all respondents supplied an answer to all items. In Table 25, the last column on the right indicates the number of respondents that provided a valid response for each item. As depicted by Table 25, the majority of respondents (92.4%) read the product's brand name in the store. Effects of human health are read in the store by 55.1% of respondents and before use by 31.4%, while 13.6% of respondents don't read this information. About 81% of respondents read information about how or where to store the product in the store or before use, and 19% don't read it at all. The relationship between respondents' answers and region of residence is not statistically significant.

Over one-quarter of respondents that were willing to answer detailed questions regarding what they read on pest control packaging report that they do not read about environmental effects. Many residents also do not read about how or where to store the product nor about effects on human health.

Table 25. What consumers read on product label and when they read it.

Information on Product Label	Read in Store	Read Before Use	Do Not Read	Total
Brand name	110 (92.4%)	5 (4.2%)	4 (3.4%)	119 (100%)
Manufacturer	61 (54.5%)	10 (8.9%)	41 (36.6%)	112 (100%)
Directions on how to use	59 (51.3%)	51 (44.3%)	5 (4.3%)	115 (100%)
Directions on how to mix	53 (46.9%)	54 (47.8%)	6 (5.3%)	113 (100%)
Description of what product does	94 (80.3%)	16 (13.7%)	7 (6.0%)	117 (100%)
Information about effects on human health	65 (55.1%)	37 (31.4%)	16 (13.6%)	118 (100%)
Information about effects on pets	65 (56.5%)	29 (25.2%)	21 (18.3%)	115 (100%)
Information about effects on water, wildlife, or environment	56 (46.7%)	31 (25.8%)	33 (27.5%)	120 (100%)
Product ingredients	46 (40.0%)	20 (17.4%)	49 (42.6%)	115 (100%)
Information about how or where to store product	42 (36.2%)	52 (44.8%)	22 (19.0%)	116 (100%)

Factors Determining Choice of Product

Respondents were asked to rate a list of factors that they use when determining what pest control products to buy. Respondents reported the factor to be “very important”, “somewhat important”, or “not important”. The graphs on the following pages are presented in descending order based on the proportion of respondents that rated each factor as “very important.” The largest proportion (65.9%) of respondents rated “easy to apply” as very important, followed by “prior use” (45.6%), “price” (38.2%), “not having to mix the product with water” (26.4%), and “having a coupon” (13.5%). Six respondents wrote in that it was very important if the product was safe for the environment. Other responses included the effectiveness of the product and safety for pets. The relationship between respondents’ answers and region of residence is not statistically significant.

Figure 5. **Importance of ease of application**

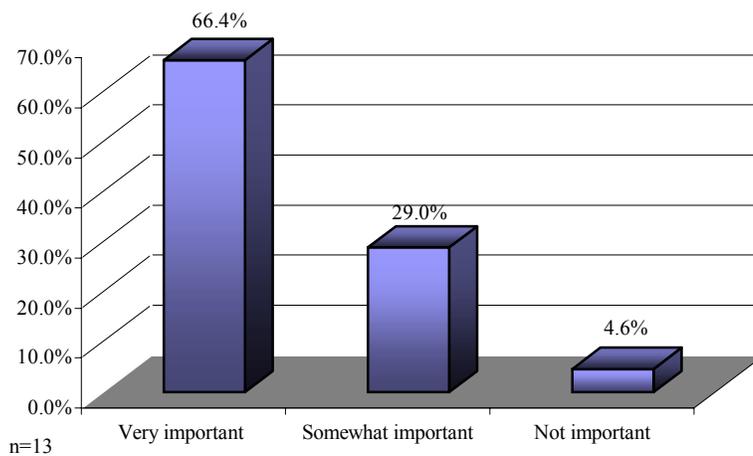


Figure 6. **Importance of whether consumer has used the product before**

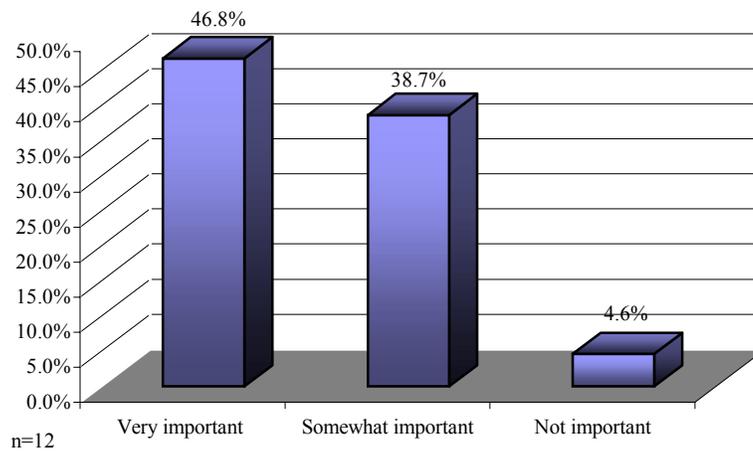


Figure 7.

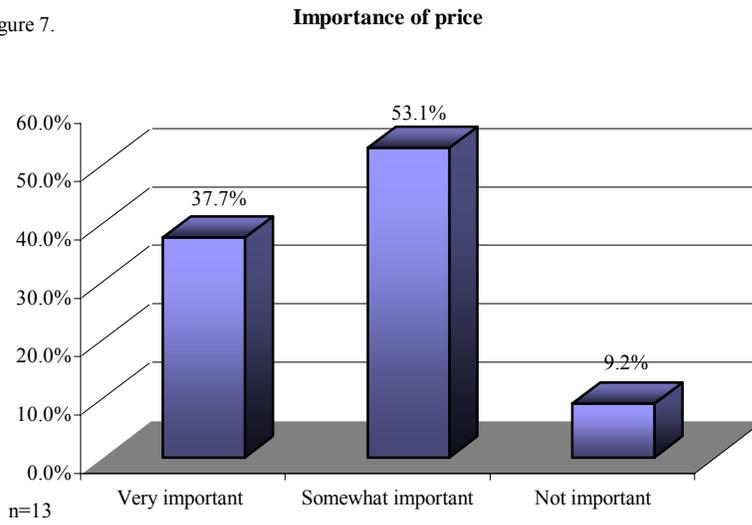


Figure 8.

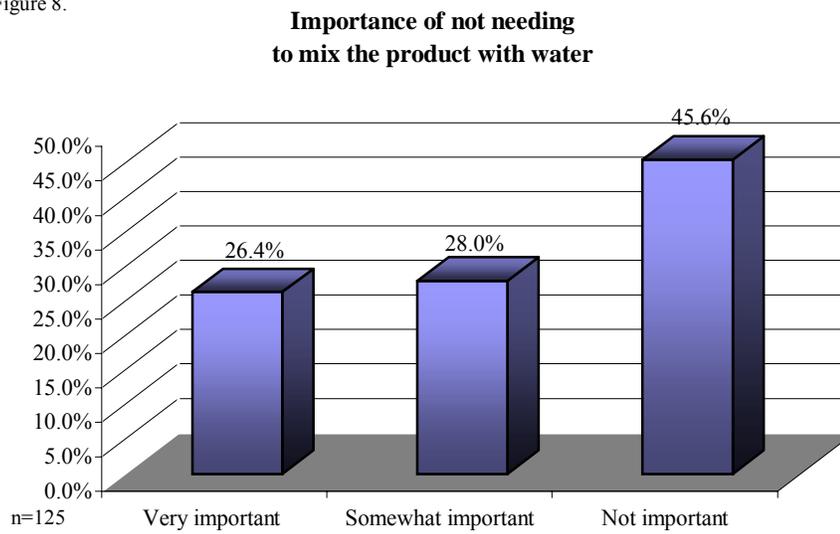
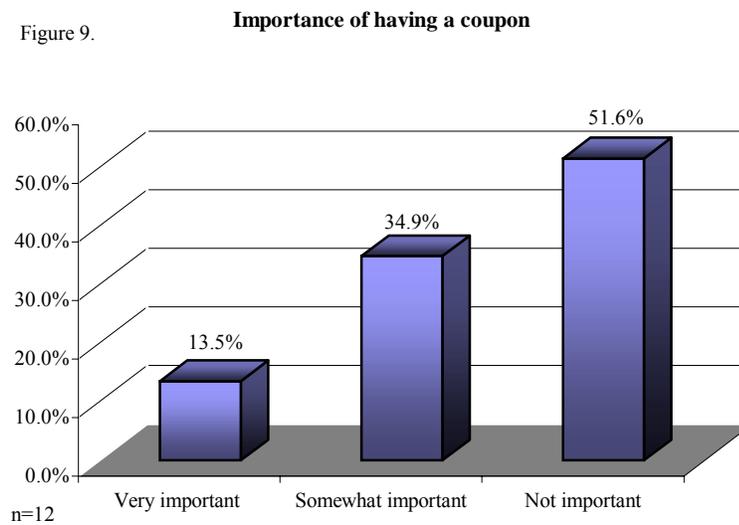


Figure 9.



SOURCE OF ADDITIONAL INFORMATION

Where Would You Prefer To Get Additional Information About Pest Control?

As shown in Table 26, the majority of respondents prefer to receive additional information about pest control from product packaging (n=76, 57.1%), followed by a product brochure (n=51, 38.3%). Ten respondents (7.5%) indicated that they did not need additional information about pest control.

Of the 19 options presented in Table 26, the only item that is statistically significant by region is the proportion of respondents in each region that indicated that they do not need additional information about pest control. Of the 63 respondents in the Delhi region, eight (12.7%) indicated that they do not need additional information on pest control products, compared to two (2.9%) of the 70 respondents that reside in the Chollas Creek region ($\chi^2 = 4.62$, $p < .05$).

Table 26. Preferred source of additional information.

	Frequency	Percent
Product packaging	76	57.1%
Product brochure	51	38.3%
Friend/neighbor/co-worker	28	21.4%
Poison control center	27	20.3%
TV	27	20.3%
Manufacturer by mail or phone	25	18.8%
Store display	25	18.8%
Environmental group	25	18.8%
Store employee	21	15.8%
Internet	17	13.2%
Government agency	10	7.5%
Radio	10	7.5%
University, Master Gardener, or Cooperative Education	10	7.5%
Consumer group	10	7.5%
I don't need additional information	10	7.5%
Newspaper	7	5.3%
Poster	6	4.5%
Library	5	3.8%
Other	3	2.3%

Receiving Additional Information and Race/ Ethnicity/ Language Spoken at Home

The sources of information detailed in Table 32 selected by at least 20 respondents were crosstabulated with respondent race/ethnicity/ language. Significant differences exist in the proportion of

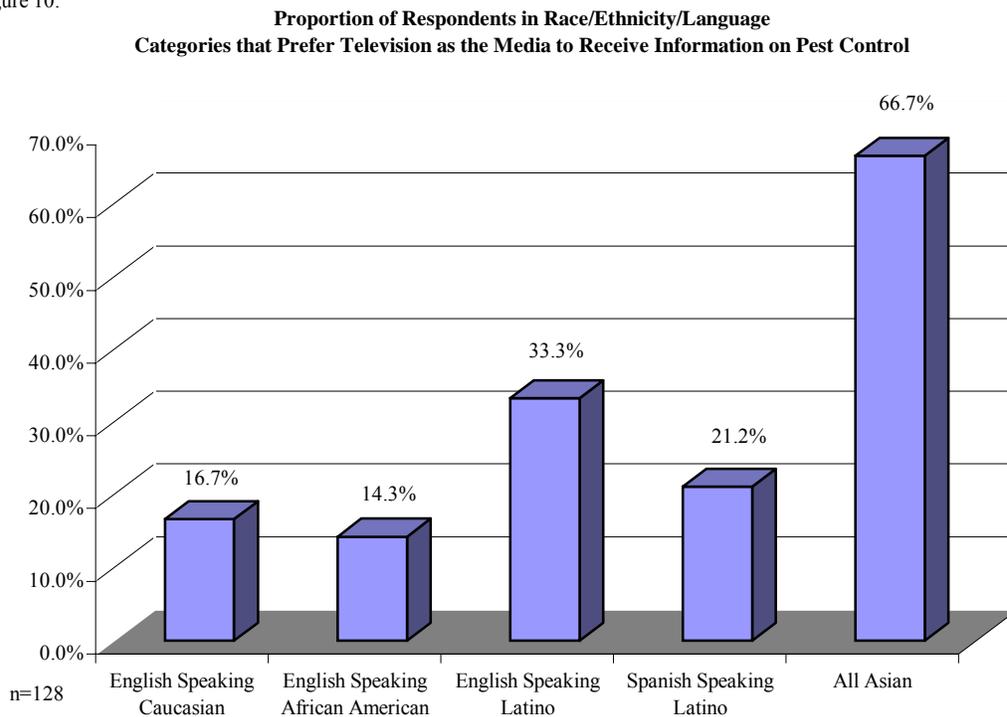
respondents that selected receiving information from a poison control center and receiving information from television.

None of the African American and Asian respondents reported that they would prefer to get additional about pest control from a poison control center, whereas receiving information from a poison control center was selected by 39.4% of Spanish-speaking Latinos, 18.2% of English-speaking Caucasians, and 11.1% of English-speaking Latinos. These differences are statistically significant ($\chi^2 = 13.18$, $p < .01$).

About two-fifths of Spanish-speaking Latinos indicated that they prefer to get information about pest control from a poison control center. None of the Asian or African American respondents indicated that they prefer to receive information this way. Over two-thirds of all Asian respondents reported that they would prefer to receive additional information about pest control on TV, whereas only one third of English-speaking Latinos selected this option.

Sixty-six percent of all Asian respondents reported that they would prefer to receive information about pest control on television, compared to one-third of English-speaking Latino respondents, 21% of Spanish-speaking respondents, 17% of Caucasian respondents, and 14% of African American respondents (Figure 10). These differences are statistically significant ($\chi^2 = 9.46$, $p < .05$).

Figure 10.



PET FLEA CONTROL

Presence of Fleas in House or on Pet

More than one-half of the 133 respondents (n=74 55.6%) indicated having a pet in their household. Eleven (33.3%) of the 33 residents of the Delhi region report having fleas in their house or on their pet, compared to 22 (53.7%) of the residents of the Chollas Creek region. This difference is statistically significant ($\chi^2 = 3.06$, $p. < .10$)¹.

Flea Control

Regardless of the presence of fleas in their house or on their pet, residents were asked if they control fleas by using various methods. Of the 74 pet owners, 35 (47.3%) reported controlling fleas by washing their pet with a special shampoo or flea dip. More reported fleas in Chollas Creek is consistent with more use of dips and shampoos. Twelve (36.4%) residents of the Delhi region compared to 23 (56.1%) residents of Chollas Creek reported using a shampoo or flea dip. This difference between regions is statistically significant ($\chi^2 = 2.86$, $p. < .10$).

Of the 72 pet-owners that provided a response, 52 (72.2%) reported controlling fleas by using a flea control pill or applying liquid pest control to their pet's back or food. Twenty-six (35.6%) of the 73 that responded reported controlling fleas by applying a pest control product on their yard. These 26 respondents were asked to indicate the form of the product that they apply to their yard. Two (7.7%) use a granule product, although most (n=23, 88.5%) use a liquid product; one survey respondent did not specify the product form.

Of the 72 pet-owners that supplied an answer, 20 (27.8%) reported using a flea-control product in their home, while 52 (72.2%) do not. Of the 20 respondents that use a flea-control product in their residence, eight (40.0%) use a fogger, seven (35.0%) use a dust or granule product and five (25.0%) use a liquid product.

Flea Control and Region

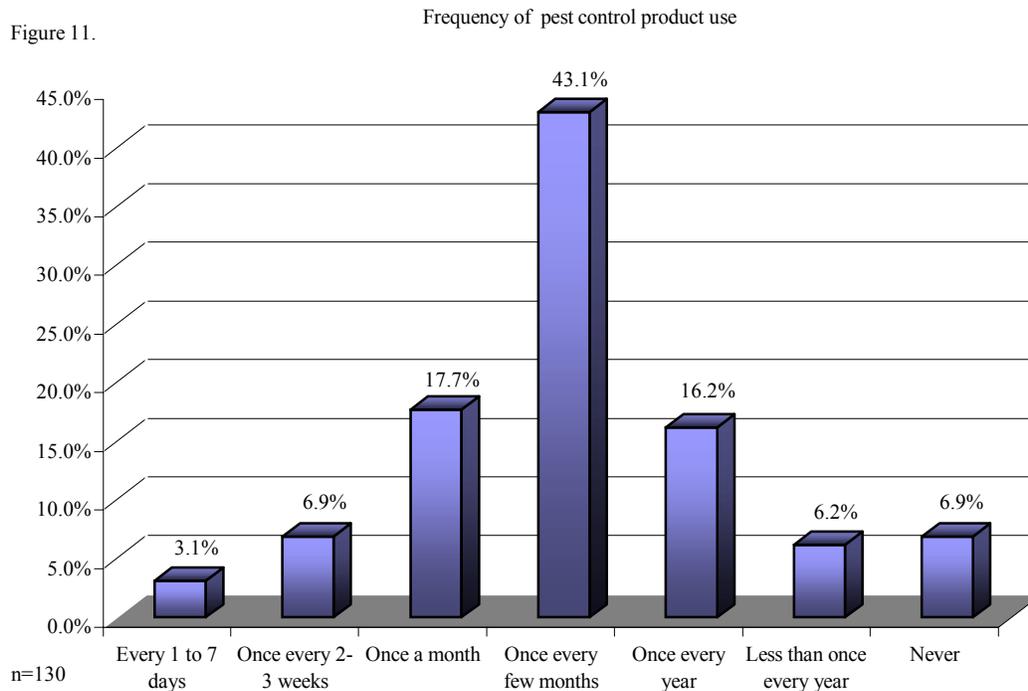
All of the respondents in Chollas Creek indicated that they used a liquid product form. Eight (80.0%) of the respondents in the Delhi region used liquid and two (20.0%) used granules. This relationship was statistically significant ($\chi^2 = 3.26$, $p. < .10$). Of the 33 Delhi Channel residents, six (18.2%) report controlling fleas by applying a product in their home compared to 14 (35.9%) of the 39 Chollas Creek residents. This relationship is statistically significant ($\chi^2 = 2.80$, $p. < .10$).

¹ Due to the small number of cases, the criterion for statistical significance was set at .10 for some analyses.

APPLICATION OF PEST CONTROL PRODUCTS

How Often Are Pest Control Products Applied at Your Residence?

Figure 11 illustrates how often respondents reported that they use pest control products either in or around their residences. Out of 133 respondents, three did not respond to this question. As depicted by the graph on the next page, overall, the most frequent pattern of use is once every few months (n=56, 43.1%), followed by once a month (n=23, 17.7%), and once a year (n=21, 16.2%). There are no significant regional differences in how often pest control products are applied.



AGREEMENT WITH STATEMENTS REGARDING PEST CONTROL PRODUCTS

Respondents were presented with a series of nine statements describing various rationales for the failure to read pest control product information and were asked to indicate if they “strongly agree”, “somewhat agree”, “somewhat disagree” or “strongly disagree” with each statement.

Products I can buy in a store are safe to use or I wouldn't be able to buy them

Twenty-eight (22.0%) respondents indicated that they “strongly agree” that products available for purchase in a store are safe to use or they wouldn't be able to buy them, followed by 42.5% that “somewhat agree” with this statement.

Information on the product label is often hard to understand

The largest proportion (40.0%) of respondents indicated that they “somewhat agree” that information on the product label is hard to understand. Fifty-two (40.0%) either “somewhat” or “strongly” disagree.

The writing on the product label is too small so I don't try to read it.

Approximately equal proportions of respondents “somewhat agree” (25.2%), “somewhat disagree” (26.7%) and “strongly disagree” (27.5%) with this statement

When using a pest control product, I rely on my own experience rather than what is on the label.
Only 16 (12.6%) respondents indicated that they “strongly agree” with this statement. Almost 60% (59.1%) indicated that they disagree.

Products advertised as “environmentally friendly” or “natural” don’t work as well as other products.
The majority (55.1%) of respondents indicated that they either somewhat or strongly disagree with this statement. Only 15 (11.8%) indicated that they strongly agree that environmental products do not work as well as other products.

I purchase pest control products with the fewest harmful effects.
Over three-quarters (78.0%) of survey respondents either strongly or somewhat agreed that they purchase pest control products with the fewest harmful effects. Twenty-eight (22.0%) respondents either somewhat or strongly disagree.

The more of the pest control product I use, the better it will control the pest.
Six (4.6%) respondents “strongly agree” that they more of a product they use, the better it will control the pests, 27 (20.8%) somewhat agree, 51 (39.2%) somewhat disagree, and 46 (35.4%) strongly disagree.

I can identify most pests myself
The largest proportion of respondents (40.8%) indicated that they “somewhat agree” with the statement, “I can identify most pests myself.” Equal proportions (21.5%) of respondents either somewhat or strongly disagree.

I measure out the correct amount needed, as directed by instructions
Of the 130 valid responses, 77 (59.2%) of the respondents “strongly agree” with this statement, seven (5.4%) somewhat and five (3.8%) strongly disagree.

Another way to gauge the extent to which respondents agree with each statement is item mean. Again, the scale used for these items ranged from 1 (strongly agree) to 4 (strongly disagree), with low scores denoting stronger agreement with an item. Table 33 below shows the mean score for each item by region of residence. For both regions, the strongest agreement was with the statement, “I measure out the correct amount needed, as directed by instructions”, and the weakest agreement was with the statement, “The more of the pest control product I use, the better it will control the pest.”

As presented in Table 27 below, respondents that reside in Delhi Channel reported stronger agreement than did respondents that reside in Chollas Creek with the statements, “I can identify most pests myself”, ($F=7.58$, $p. < .01$), and, “I measure out the correct amount needed, as directed by instructions”, ($F=3.11$, $p. < .10$)². Conversely, Chollas Creek residents reported stronger agreement than did Delhi Channel residents with the statement, “Products I can buy in a store are safe to use or I wouldn’t be able to buy them”, ($F =5.85$, $p. < .05$). These were the only items that were statistically significant between residents of the two regions. The mean scores for all statements are presented in Table 27.

² Recall that due to the small number of cases, the criterion for some analyses was set at .10.

Table 27. Agreement with statement regarding pest control (row) by region (column). Lower scores represent stronger agreement.

	Mean scores by region of residence	
	Delhi Channel	Chollas Creek
Products I can buy in a store are safe to use or I wouldn't be able to buy them.**	2.51	2.08
Information on the product label is often hard to understand.	2.40	2.20
The writing on the product label is too small so I don't try to read it.	2.70	2.54
When using a pest control product, I rely on my own experience rather than what is on the label.	2.72	2.82
Products advertised as "environmentally friendly" or "natural" don't work as well as other products.	2.56	2.63
I purchase pest control products with the fewest harmful effects.	1.89	1.88
The more of the pest control product I use, the better it will control the pest.	3.08	3.03
I can identify most pests myself.***	2.25	2.73
I measure out the correct amount needed, as directed by instructions.*	1.42	1.66

*p. < .10; **p. < .05; ***p. < .01

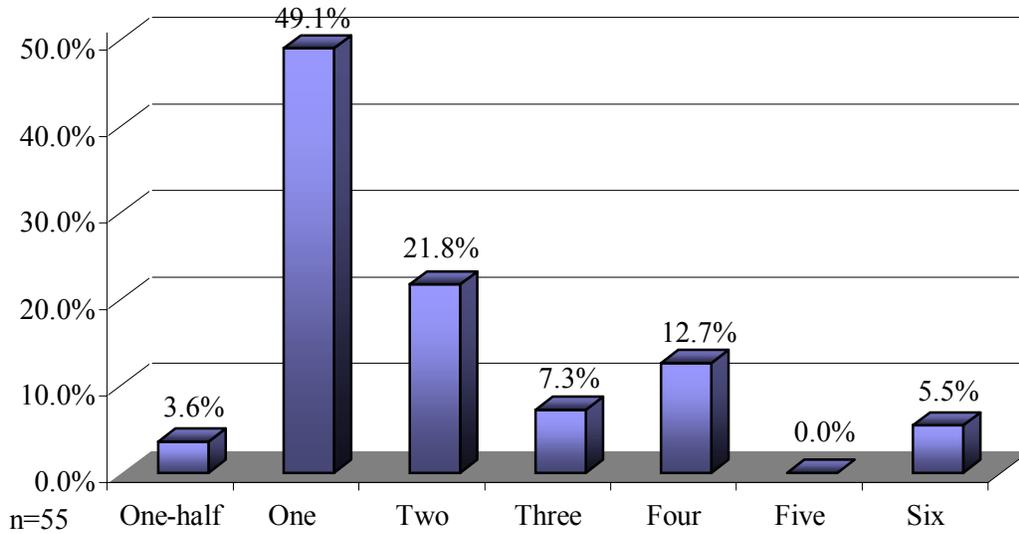
PRODUCTS USED OR PURCHASED IN THE LAST 12 MONTHS

Products Used or Purchased To Control Weeds

Respondents were asked whether they had purchased and/or used a product to control weeds in the past 12 months. Of the 127 valid responses, 60 (47.2%) reported that they had, while 67 (52.8%) had not. The 60 survey respondents that had purchased and/or used a product to control weeds were asked how many packages, bottles or cans they had used. Five respondents did not provide an answer to this question. As presented in the graph below, approximately one-half (49.1%) of the respondents reported that they have used only one package, bottle or can.

Figure 12.

Number of packages, bottles or cans of weed control products used in the past 12 months



Products Used or Purchased To Control Weeds and Region

Respondents living in Delhi Channel reported a greater mean number of packages, bottles, or cans (2.33) than did respondents living in Chollas Creek (M=1.60). This difference was statistically significant ($t=2.03$, $p. <.05$).

Delhi residents report using more packages, bottles or cans to control weeds in the past twelve months than Chollas Creek residents. They also report using different product forms to control weeds

Product Form

The 60 respondents that indicated that they purchased a product to control weeds in the past 12 months listed a total of 74 products that they have used. As depicted by Table 28 below, approximately 30% of the 74 products used by these 60 respondents have been a ready-to-use liquid, followed by 20 (27%) liquid or dry concentrate products, and 19 (25.7%) dry granules or powder products. Percentages are computed based on the 74 separate product forms, not on the 60 respondents that have used a pest control product to control weeds.

Table 28. Form of weed control product.

Product Form	Frequency	Percent
Ready-to-use liquid	22	29.7%
Liquid or Dry Concentrate	20	27.0%
Dry granules or powders	19	25.7%
Hose-end spray	13	17.6%
Total	74	100.0%

Product Form Used or Purchased To Control Weeds and Region

As presented in Table 29 below, 15 (45.5%) residents of the Delhi region reported using dry granules or powder to control weeds around their residence compared to four (14.8%) residents of the Chollas Creek region. One-third of the Chollas Creek residents reported that they have used a liquid or dry concentrate in the past 12 months, compared to six (18.2%) residents in the Delhi Channel region. These differences between regions are statistically significant ($\chi^2 = 6.60$, $p < .10$).

Table 29. Product form used to control weeds (row) by Region (column)

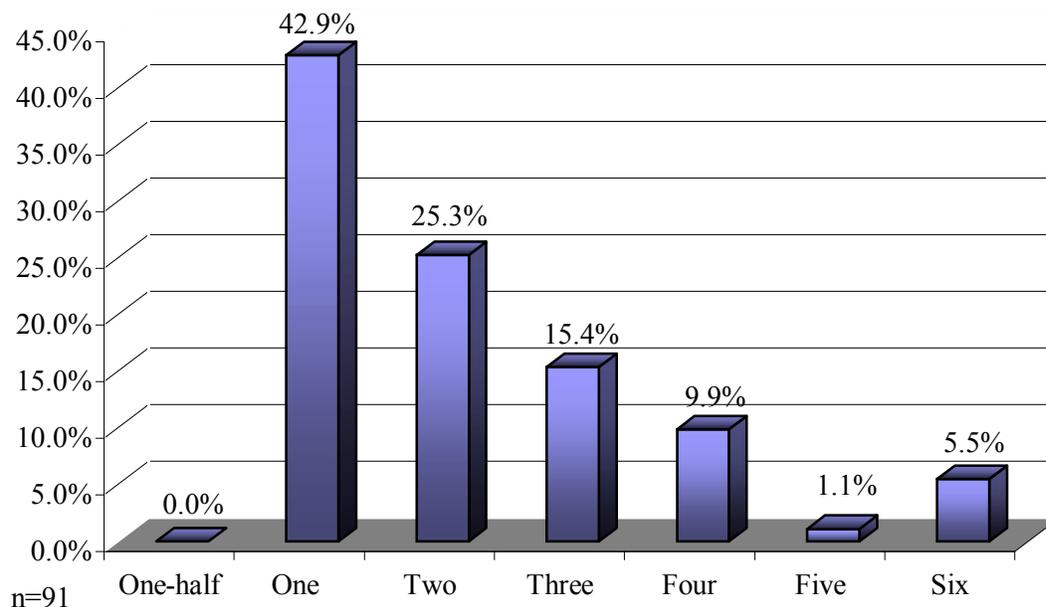
Product Form	Delhi Channel	Chollas Creek
Dry granules or powders	15 (45.5%)	4 (14.8%)
Ready-to-use liquid	8 (24.2%)	9 (33.3%)
Hose and spray	4 (12.1%)	5 (18.5%)
Liquid or dry concentrate	6 (18.2%)	9 (33.3%)
Total	33 (100.0%)	27 (100.0%)

Products Used or Purchased To Control Insects

Respondents were asked to indicate if they had purchased and/or used a product to control insects in the past 12 months. Of the 131 valid responses, 101 (77.1%) reported that they had. Of the 62 Delhi residents that provided a response, 52 (83.9%) indicated that they had purchased a product within the past 12 months to control insects, compared to a lower proportion ($n=49$, 71.0%) of the 69 residents of Chollas Creek that responded (Figure 13). This regional difference is statistically significant ($\chi^2 = 3.06$, $p < .10$).

Of the 101 respondents that had purchased or used a product, ten did not know how many packages, bottles or cans they had used.

Figure 13. **Number of packages, bottles or cans of insect control products used in the past 12 months**



Product Form

As detailed in Table 30, the largest proportion (41.5%) of respondents indicated that they have used a ready-to-use liquid form of a pest control product to control insects. Percentages are computed based on the 123 responses provided by the 102 respondents that have used a pest control product to control insects during the previous 12 months. There is no statistically significant relationship between the product form and region.

Table 30. Form of insect control product.

Product Form	Frequency	Percent
Ready-to-use liquid	51	41.5%
Liquid or Dry Concentrate	21	17.7%
Dry granules or powders	33	26.8%
Hose-end spray	18	14.6%
Total	123	100.0%

Products Used or Purchased To Control Plant Diseases

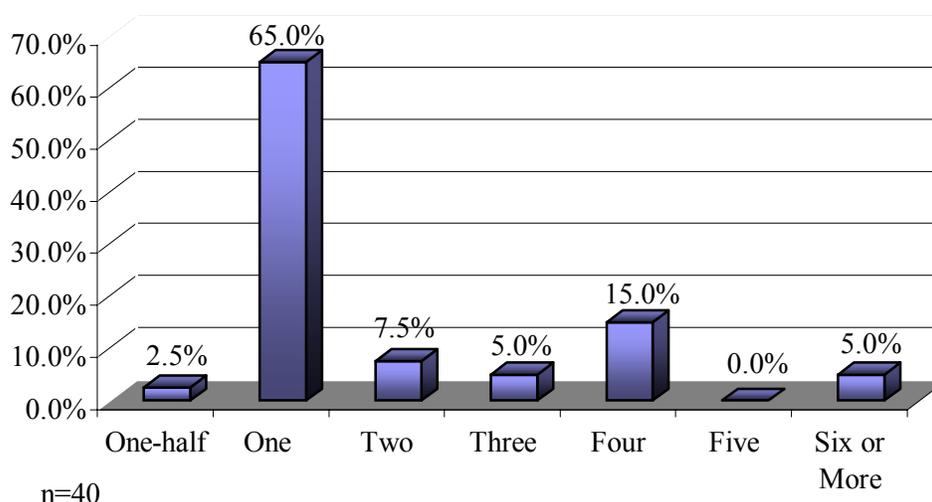
Respondents were asked to indicate if they had purchased and/or used a product in the past 12 months to control plant diseases. Of the 126 valid responses, 41 (32.5%) reported that they had. Of the

62 Delhi residents that provided a response, 26 (41.9%) indicated that they had purchased a product within the past 12 months to control plant diseases, compared to 15 (23.4%) of the 64 residents of Chollas Creek that responded. This difference between regions is statistically significant ($\chi^2 = 4.91$, $p < .05$).

One respondent did not provide information on the number of packages, bottles or cans used. Of the 40 valid responses, the majority (65%) of respondents reported that they had used only one package, bottle or can. This was followed by six respondents (15%) that had used four packages, bottles or cans during the past 12 months to control plant diseases (Figure 14).

Figure 14.

Number of packages, bottles or cans of plant disease control products used in the past 12 months



Product Form

As detailed in Table 31, the largest proportion (40.5%) of respondents indicated that they have used a ready-to-use liquid form of a pest control product to control plant diseases. This was followed by 12 (25.5%) respondents that have used a hose and spray product, and eight (17.0%) that have used a liquid or dry concentrate and eight that have used dry granules or powders. Percentages are computed based on 47 different product forms reported by survey respondents. The relationship between the form of the product and region is not statistically significant.

Table 31. Form of plant disease control product.

Product Form	Frequency	Percent
Ready-to-use liquid	19	40.5%
Liquid or Dry Concentrate	8	17.0%
Dry granules or powders	8	17.0%
Hose-end spray	12	25.5%
Total	47	100.0%

DISPOSAL OF PRODUCTS

Respondents were asked to indicate how they dispose of pest control products that they either no longer use or that they have mixed too much of. Fifteen respondents skipped this series of questions. Of the 119 respondents that provided information, just over one-half (50.4%) reported that they throw unused products in the trash, followed by 38 (31.9%) that store the products, and 29 (24.4%) that take unused products to a household waste facility. Percentages are computed based on the 119 valid responses. A total percentage is not included in Table 32 since respondents could select more than one option.

Over one half of the survey respondent reported that they throw unused products in the trash. The method that respondents use most often is also to throw unused products in the trash—this does not significantly differ between residents in Delhi and Chollas Creek.

Table 32. How pest control products are disposed of.

Disposal of Products	Frequency (Percent)
Put in the trash	60 (50.4%)
Store them in or near my residence	38 (31.9%)
Take to a household waste facility	29 (24.4%)
Pour on the lawn or garden	21 (17.6%)
Give away	10 (8.5%)
Pour down the sink or toilet	6 (5.0%)
Pour down the drain outside	5 (4.2%)
Pour in the street	2 (1.7%)
Other	18 (15.1%)

Other responses included “I follow the directions on the label.”

Disposal Of Products and Region

Of the 60 Delhi residents that provided a response, 22 (36.7%) indicated that they take their unused products to a household waste facility, compared to only seven (11.9%) of the 59 Chollas Creek residents. This difference is statistically significant ($\chi^2 = 9.93$, $p < .01$).

Disposal Method Used Most Often

Respondents were asked to indicate, using the same options for disposal discussed above, the one disposal method that they used most often. As presented in Table 39, 80 (60.2%) survey respondents did not provide a response to this question. Of the 53 valid responses, the largest proportion (16.5%) of survey respondents indicated that they dispose of pest control products that they have used or mixed too much of by throwing them in the trash. All responses are detailed in Table 33 below. The relationship between disposal method and region is not statistically significant.

Table 33. Primary method of pest control product disposal.

Disposal of Products	Frequency	Percent
Put in the trash	22	16.5%
Store them in or near my residence	14	10.5%
Take to a household waste facility	11	8.3%
Pour on the lawn or garden	2	1.5%
Give away	0	0%
Pour down the sink or toilet	1	.8%
Pour down the drain outside	0	0%
Pour in the street	0	0%
Other	3	2.3%
Missing	80	60.2%
Total	133	100.0%

Knowledge of location of waste facility

Of the 133 respondents, 17 did not answer this question. Of the 116 that responded, 49 (42.2%) indicated that they know where a household waste facility is located and 67 (57.8%) do not. Four respondents that indicated that they take their unused pest control products to a waste disposal facility reported that they do not know where a facility is located. There were no significant differences between regions.

PRODUCTS STORED IN OR AROUND RESPONDENT'S RESIDENCE

In-home survey respondents were asked to provide information for up to eight pest control products that they had either in or around their home. If they had more than eight products, they were instructed to check a box and record the information for the eight products that they used most often. Of the 133 respondents, 42 (31.6%) wrote on the survey that they do not have any pest control products at their residence. Because not all respondents provided complete information for each product, where applicable, percentages are computed based on the number of valid responses and this number if provided.

There are no significant differences between the responses provided for each of the separate products identified by survey respondents so all products are combined for ease of analysis and

presentation. As presented in Table 34, 91 respondents listed 244 individual products on the in-home inventory.

Table 34. Number of products stored at residence

	Frequency
One	91
Two	55
Three	40
Four	25
Five	12
Six	9
Seven	7
Eight	5
Total	244

Product Name

Approximately 13.5% of the respondents listed their pest control product as Raid. This was followed by Round-Up, Diazinon, Real Kill, Black Flag Ant and Roach Killer, Spectracide/ Spectracide Immunox, and Ortho Rose Pride. Table 35, depicts the products named by at least two respondents. These data account for approximately 53% of all survey responses.

Table 35. Name of pest control products stored in or near home.

Product Name	Frequency	Percentage
Raid	33	13.5%
Round-up	11	4.5%
Diazinon	7	2.9%
Real Kill	5	2.0%
Black Flag Ant and Roach Killer	5	2.0%
Spectracide/ Spectracide Immunox	5	2.0%
Ortho Rose Pride	5	2.0%
Ortho Home Defense	5	2.0%
Hot Shot	4	1.6%
Ortho	4	1.6%
Ant and Roach Killer - Unspecified	4	1.6%
Malathion	4	1.6%
Weed-B-Gone	4	1.6%
Term Out	4	1.6%
Bugs-B-Gone	4	1.6%
Boric Acid	3	1.2%
Combat	3	1.2%
Raid Ant Kill- Unscented	3	1.2%
Bugs-B-Dead	2	0.8%
Black Flag Flying Insect	2	0.8%
Safer Caterpillar Killer	2	0.8%
Weed and Feed	2	0.8%
Worry Free Slug and Snail	2	0.8%
Rose Pride Othenex	2	0.8%
D-Con	2	0.8%
Real Kill Grass and Weed Killer	2	0.8%

Product Form

The product form is available for 233 of the 244 total products reported by survey respondents. As presented in the Table 36, the proportion of respondents that reported the product form as a ready-to-use spray (25.8%), a compressed gas aerosol spray (26.2%), and a concentrated spray (26.6%) are almost identical. The smallest proportion of respondents (19.3%) use a dry granule form of the product.

Table 36. Form of pest control product.

Product Form	Frequency	Percent
Ready-to-use spray	60	25.8%
Compressed Gas Aerosol Spray	61	26.2%
Concentrated Spray	62	26.6%
Dry granules	45	19.3%
Other	5	2.1%
Total	233	100.0%

Why Product was used

Survey respondents named a total of 221 pests that require control. As presented in the table on the following page, ants were the most common pest reported, followed by weeds, unspecified or unidentified insects, cockroaches, fleas, unspecified plant diseases, aphids, and whiteflies. The top eight responses are presented in Table 37 and encompass approximately 80% of all responses.

Table 37. Product use.

Pest Problems	Frequency	Percentage
Ants	61	27.6%
Weeds	26	11.8%
Insects- unspecified	23	10.4%
Cockroaches	22	10.0%
Fleas	19	8.6%
Plant Diseases	11	5.0%
Aphids	9	4.1%
Whiteflies	6	2.7%

Product Size

Forty respondents reported the size of the product in pounds. Eighteen of these reported the product to be one pound, nine reported it to be two pounds, five reported the size of the product as five pounds, and one respondent each reported the product size to be eight, ten, twelve, thirteen and twenty pounds. For the 183 respondents that reported the size of the product in ounces, responses ranged from one and one-half ounces to 128 ounces, with an average of 22.5. Twenty-one respondents did not report the size of the product.

Product Point of Sale: Store Name

Respondents were asked to provide the store name where their purchase was made. The point of sale for ten of the 244 products was not provided. Table 38 details the ten most frequent responses, which account for approximately 79% of all stores identified. As shown in the table, the largest proportion (44.4%) of the products have been purchased at Home Depot, with an additional 8.5% purchased at K-Mart.

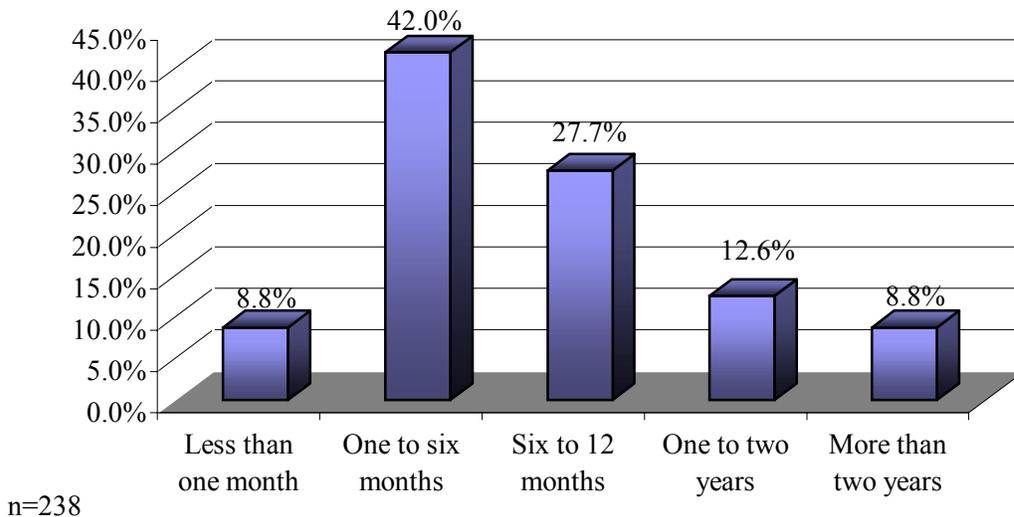
Table 38. Store where product was purchased.

Name of Store	Frequency	Percent
Home Depot	104	44.4%
K-Mart	20	8.5%
WalMart	11	4.7%
Target	10	4.3%
Other grocery or drug store	10	4.3%
Vons/ Pavilions	8	3.4%
Nursery	7	3.0%
Albertson's	6	2.6%
Stater Brothers	5	2.1%
Ralphs	5	2.1%

Product Age

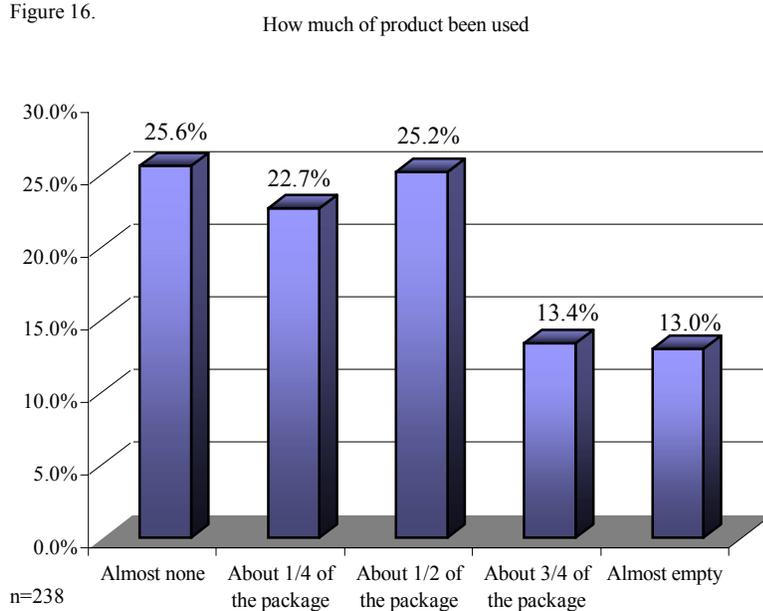
Respondents were asked to provide the approximate age of each of the products that they have. As presented in the graph below, the largest proportion (42.0%) of respondents reported that the products were between one and six months old. Sixty-six (27.7%) reported that the product was between six and 12 months old. The graph on the following page presents the information for the 238 valid responses for this question for all eight products.

Figure 15. Age of pest control product



How Much of the Product Has Been Used?

Respondents were asked to indicate approximately how much of the product has been used. The graph on the following page depicts the responses for 238 products reported by 91 survey respondents that had at least one product at their residence. As illustrated by this graph, the proportion of respondents that report having used almost none (25.6%), about one-quarter (22.7%), and about one-half (25.2%) of the products are very similar.



Where is the Product Stored?

Information about where the product was stored was available for 237 of the 244 products listed by survey respondents (Table 39). The largest proportion (46.0%) of respondents store the product in their garage, followed by 67 (28.3.0%) that store it inside their home, and 61 (25.7%) that store the product outside their home.

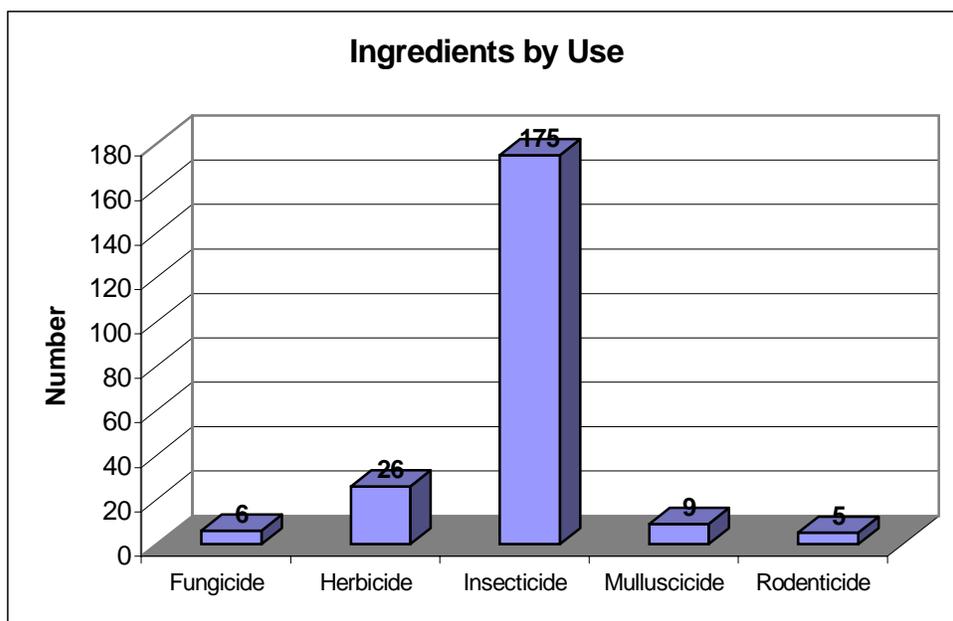
Table 39. Storage areas for pest control products.

Product Storage	Frequency	Percent
Inside Home	67	28.3%
Outside Home	61	25.7%
Garage	109	46.0%
Total	237	100.0%

PRODUCT INVENTORY

In addition to listing the product name of pesticides stored in and around their homes, respondents were also asked to list the active ingredients in those products. We were able to identify a total of 53 different active ingredients out of 222 active ingredients that were listed (Appendix C.2.). Not all the active ingredients listed on the survey sheets could be identified; either the names were incomplete or the spelling or handwriting made it impossible to clearly identify the pesticide. The majority of the pesticides were insecticides, followed by herbicides. Mulluscicides, rodenticides, and fungicides made up the balance (Figure 17).

Figure 17. Home inventory of pesticides by use.



Herbicides

Of the 26 times a herbicide was listed, the most frequent active ingredient was glyphosate (8/26), followed by diquat dibromide and 2,4-D (both 5/26). Other herbicides were fluzafop-p-butyl (3/26), MCPP, mecoprop, MSMA, pendimethalin, and triclopyr (1/26 for the last five active ingredients).

Fungicides, Rodenticides, and Mulluscicides

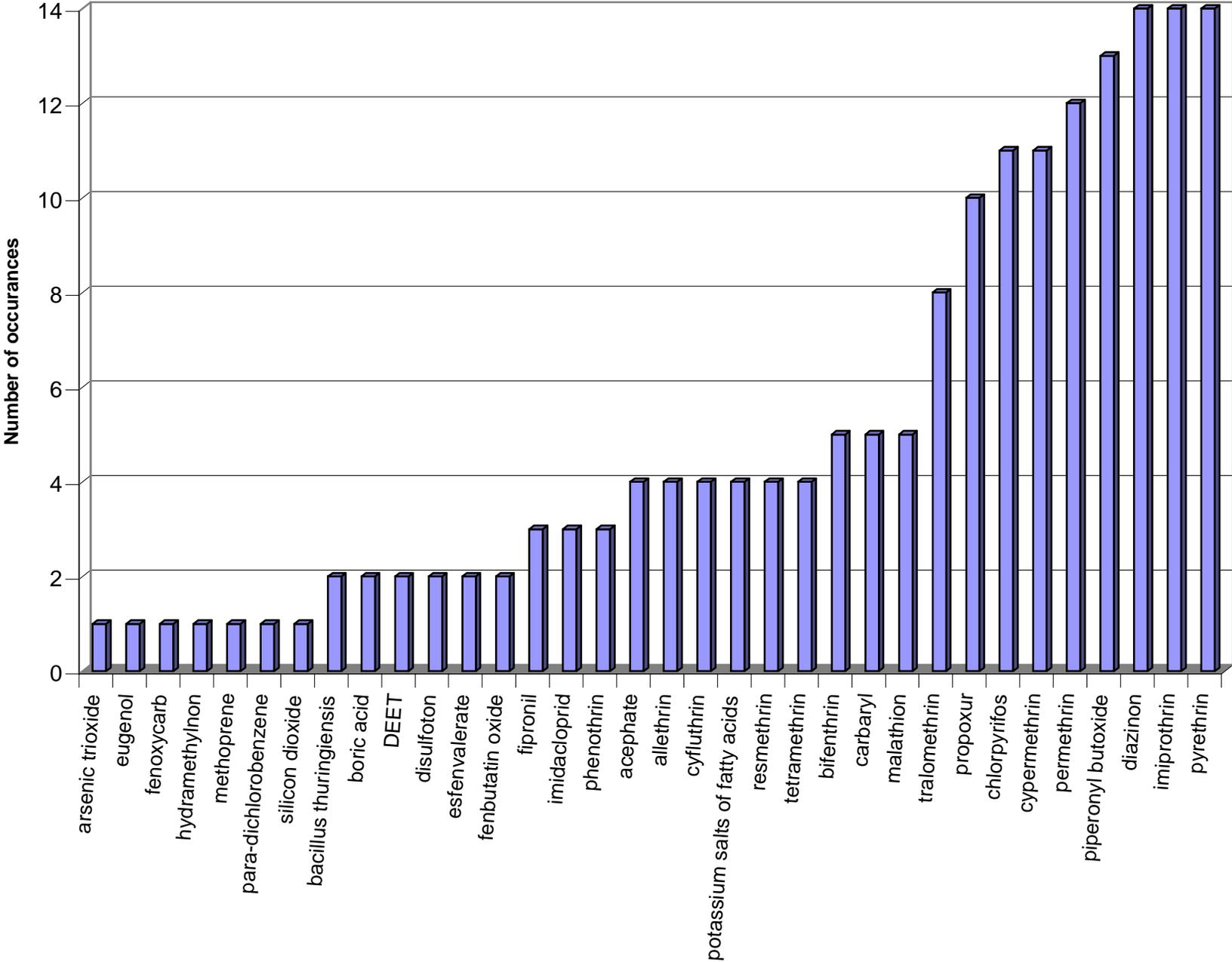
Fungicides listed were lime-sulfur (1/6), myclobutynil (1/6), sulfur (1/6), trifenol (2/6), and neem oil (1/6). Three rodenticides were listed in the home inventory – brodifacoum (2/5), warfarin (2/5), and zinc phosphide (1/5). For snail and slug control, metaldehyde was the product listed most often (8/10). Iron phosphate was also listed (2/10).

Insecticides

The largest category of pesticides stored in and around homes was insecticides. Of the 53 active ingredients 33 were listed as active ingredients on insecticide labels. As shown in Figure 18, the most commonly listed active ingredients were pyrethrin, imiprothrin, diazinon (14 each), piperonyl butoxide (13), permethrin (12), cypermethrin (11), chlorpyrifos (11), propoxur (10), and tralomethrin (8). The remaining active ingredients were listed 5 or fewer times. Pyrethroids make up the largest class of active ingredients. Only a small proportion of the active ingredients listed would be considered “least-toxic”,

e.g. *Bacillus thuringiensis*, eugenol, boric acid, and silicon dioxide. However, many of products are in bait formulation or applied as an aerosol where the percentage of active ingredient is usually 2% or less or in a ready to use diluted spray.

Figure 18. Number of occurrences of each insecticide active ingredient identified from the in-home inventory.



V. Overall Summary and Recommendations

A telephone and written survey was conducted in 2001 to determine non-professional use of pesticides in and around homes in the Chollas Creek and Santa-Ana-Delhi watersheds. Most consumers purchased their products from large home supply chain stores and depended on label advertising for information regarding their choice of product. Home Depot was clearly the largest retailer of these products with over 44% of the products purchased there. The primary reason most consumers purchased an outdoor pest control product was for ant control and usually the product was an aerosol formulation. The second pest most likely to be controlled by pesticides was snails or slugs.

Insecticides were the category of pesticide most reported to be stored in and around homes. This is not surprising since insects were listed as the majority of pests both inside and outside of homes. Only a small proportion of the active ingredients listed would be considered “least-toxic”. As a class, pyrethroids and pyrethrins made up the largest group of active ingredients. Products containing diazinon and chlorpyrifos were found on respondents’ inventory.

Regardless of whether a home was rented or owned, those in single-family detached homes were more likely to apply pest control products only by themselves. Those that rented a detached home, though, would be twice as likely to have a commercial applicator do all of their outdoor pest control. Professional companies were more likely to provide pest control services for attached homes, e.g. apartments and condominiums.

Consumers prefer to use products that require the least amount of work to apply. Aerosols were the form of outdoor pest control most used (43%), follow by ready to use sprays (21%). They also appear to dispose of the products in a manner that requires the least amount of effort. The majority of residents used their trashcans for disposal of products regardless of whether the container was empty or not. Approximately half of the respondents did not know the location of their local household hazardous waste site

Choice of which pesticide to purchase was influenced primarily by whether the product was easy to apply and whether they had used the product before. Price or availability of a coupon had little effect on their choice. We found that prior to purchase over 90% of the respondents read the brand name on the label but only 47% read the effects on water, wildlife, or the environment.

Information about the product should be made available on the product packaging or near the product. Few people wanted to get their information from a newspaper, poster, or library. Even a store display was not ranked high as a source of additional information. One may infer from that that consumers would like to be able to have something “in-hand”, that they can take with them, rather than being told or reading the information outside the home.

Residents of the Chollas Creek watershed had significantly less formal education than those in the Santa Ana-Delhi Channel watershed with over 30% have less than a high school education. Additionally, over 25% of the interviewees in that region earned less than \$15,000/year. English and Spanish are the primary languages spoken in both regions. Consequently, these demographic factors must be considered when creating educational materials for training residents in how to use and dispose of pesticides as well as how to use alternative methods of pest control.

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APPENDICES

Appendix A. Santa Ana-Delhi Channel Chollas Creek Pest Control Telephone Survey
FINAL Questionnaire – November 1, 2001

- SHELLO Hello, my name is _____ and I'm calling from the Social Science Research Center at California State University, Fullerton. Have I reached [READ RESPONDENT'S TELEPHONE NUMBER]?
- INTRO1 We're calling on behalf of the University of California, Cooperative Extension to collect information on the use and disposal of pest control products. This is an important scientific study, not a sales call.
- VERZIP We're contacting households that we think are included in the study area, but may we verify that your zip code is [READ ZIP CODE]
1. CORRECT [SKIPTO INTRO2]
2. INCORRECT [CONTINUE]
- ZIPREAL May we please have your correct zip code?
- ZIP CODE>
99998. DK/NR
99999. REFUSED
- [IF ZIPCODE ~= 92626, 92627, 92707, 91945, 92114, 92105, 92102, OR 92113, RESPONDENT IS NOT QUALIFIED]
- INTRO2 We are conducting a scientific study in your area to learn about residents' use of pest control products. This survey is important and it takes approximately five minutes to complete. Your identity and your responses will remain completely anonymous and confidential, and of course, you are free to decline to answer any survey question.
I should also mention that this call may be monitored by my supervisor for quality control purposes only.
Is it all right to ask you these questions now?
1. YES [SKIPTO HOUSE]
2. NO [CONTINUE]
- APPT When would be a more convenient time to ask you the survey questions?
- SCHEDULE CALLBACK

- HOUSE The type of residence that you live in is relevant to questions about pest control.
Do you live in a...
1. Single family detached home
 2. Attached home such as a condo or townhouse
 3. Apartment
 4. Mobile home
 5. OTHER (Specify: _____)
 7. DON'T KNOW
 9. REFUSED
- WHO To gain an understanding of residential pest control practices in your area, would you please tell us who at your residence applies outdoor pest control products?
1. Yourself [SKIPTO OFAGE]
 2. Another member of your household [CONTINUE]
 3. Commercial company, apartment complex or Home-owners Association not directly contracted by you [SKIPTO OFAGE]
 4. Yourself and a pest control company that you contract with directly [SKIPTO OFAGE]
 5. Only a pest control company that you contract with directly [SKIPTO OFAGE]
 6. Other (Please specify), or would you say [SKIPTO OFAGE]
 7. No outdoor pest control products are applied at my residence [OFAGE]
 8. DK/NR [SKIPTO OFAGE]
 9. REFUSED [SKIPTO OFAGE]
- WHO2 May we please speak to that person or to someone who knows about the application of pest control products at your residence?
1. YES [SKIPTO OFAGE]
 2. NO [CONTINUE]
- CALLBAK1 Can you please tell me when to call back to reach the person that knows about the application of pest control products at your residence?
- SCHEDULE CALLBACK
- OFAGE May we please verify that you are eighteen years of age or older?
1. YES [SKIPTO TRANS1]
 2. NO [CONTINUE]
- OFAGE2 May we please speak to someone who is over 18, that knows about the application of pest control products at your residence?

1. YES
2. NO [SCHEDULE CALLBACK]

TRANS1 We'd like to begin by asking you about your MAIN outdoor pest problem.

PRESS '1' TO CONTINUE

[IF WHO = 7, 8 OR 9, SKIPTO TRANS2]

Q1 What do you consider to be the MAIN outdoor pest problem around your residence?

1. SPECIFY
2. DO NOT HAVE OUTDOOR PEST PROBLEM [SKIPTO TRANS2]
7. DK/NR [SKIPTO TRANS2]
9. REFUSED [SKIPTO TRANS2]

Q2 What is the name of the product that you use to control this pest problem?

1. SPECIFY PRODUCT NAME>
2. PEST CONTROL COMPANY APPLIES [SKIPTO TRANS2]
7. DK/NR [SKIPTO TRANS2]
9. REFUSED [SKIPTO TRANS2]

Q3 What form of this product do you use? Is it a...

1. Ready-to-use pump spray, like a window cleaner sprayer
2. Ready-to-use aerosol spray, like a spray paint can
3. Concentrated spray that you must add water to
4. Dry granule
5. Bait
6. Other (Specify)
7. DK/NR
8. REFUSED

Q4 Do you have any other outdoor pests problems, such as insects, diseases, snails, or weeds, around your residence?

1. YES [SKIPTO TRANS2]
2. NO [SKIPTO TRANS2]
7. DK/NR [SKIPTO TRANS2]
9. REFUSED [SKIPTO TRANS2]

Q4A Can you please describe the outdoor pest problems around your residence?

OPN

TRANS2 The next few questions are about pest control inside your residence.

- Q5 Who does your INDOOR pest control?
[READ OPTIONS ONLY IF NECESSARY]
1. YOURSELF
 2. ANOTHER MEMBER OF YOUR HOUSEHOLD
 3. COMMERCIAL COMPANY, APARTMENT COMPLEX OR HOME OWNERS ASSOCIATION NOT DIRECTLY CONTRACTED BY YOU
 4. YOURSELF AND A PEST CONTROL COMPANY THAT YOU CONTRACT WITH DIRECTLY
 5. ONLY A PEST CONTROL COMPANY THAT YOU CONTRACT WITH DIRECTLY
 6. OTHER (PLEASE SPECIFY), OR WOULD YOU SAY
 7. NO INDOOR PEST CONTROL PRODUCTS ARE APPLIED AT MY RESIDENCE
 8. DK/NR
 9. REFUSED

Q6 What do you consider to be the MAIN indoor pest problem in your residence?

1. SPECIFY
2. DO NOT HAVE INDOOR PEST PROBLEMS [SKIPTO Q9]
7. DK/NR
9. REFUSED

Q7 What is the name of the product that you use to control this pest problem?

1. SPECIFY PRODUCT NAME>
2. PEST CONTROL COMPANY APPLIES [SKIPTO Q9]
7. DK/NR [SKIPTO Q9]
9. REFUSED [SKIPTO Q9]

Q8 What form of this product do you use?
[READ OPTIONS ONLY IF NECESSARY]

1. READY-TO-USE PUMP SPRAY, LIKE A WINDOW CLEANER SPRAYER
2. READY-TO-USE AEROSOL SPRAY, LIKE A SPRAY PAINT CAN
3. CONCENTRATED SPRAY THAT YOU MUST ADD WATER TO
4. DRY GRANULE
5. BAIT
6. OTHER (SPECIFY)
7. DK/NR
9. REFUSED

Q9 How do you usually dispose of pest control products that you no longer use?

1. Pour down drain or toilet inside your house
2. Pour down drain outside your house
3. Pour in the gutter or street
4. Put in trash
5. Take to hazardous waste disposal site
6. Give away
7. Other (Please specify)
8. DK/NR
9. REFUSED

Q10 Now we'd like to ask some questions regarding your background-- first, what is your age?

AGE>

98. DON'T KNOW
99. REFUSED

Q11 Do you own or rent your home?

1. OWN
2. RENT
7. DK/NR
9. REFUSED

Q12 What is the primary language spoken in the home?

1. ENGLISH
2. SPANISH
3. VIETNAMESE
4. JAPANESE
5. FARSI
6. MANDARIN
7. OTHER (PLEASE SPECIFY)
8. DK/NR
9. REFUSED

Q13 How do you describe your race or ethnicity?

1. Asian (SPECIFY: _____)
2. Black or African American
3. Hispanic or Latino
4. Caucasian or White
5. OTHER (SPECIFY: _____)
7. DON'T KNOW
9. REFUSED

Q14 What was the last grade of school that you completed?

1. Some high school or less
2. High school graduate
3. Some college
4. College graduate
5. Post-graduate degree
7. DK/NR
9. REFUSED

Q15 Which of the following categories best describes your total household or family income before taxes, from all sources?

1. Less than \$15,000
2. \$15,000-24,999
3. \$25,000-44,999
4. \$45,000-69,999
5. \$70,000-99,999
6. More than \$100,000
7. DK/NR
9. REFUSED

[IF HOUSE > 1, SKIPTO CONCLUDE]

MAIL. Thank you so much for your answers thus far. We would like to mail you a survey to obtain more detailed information about your use and disposal of pest control products. After you have completed and returned the survey, we will send you a pre-paid calling card that will give you 60 minutes of national telephone time, or less time if you call internationally. Your responses to the survey will be used by University of California researchers to develop educational programs. Will you be able to participate in this research?

1. YES
2. NO

[SKIPTO CONCLUDE]

ADDRS. May we please have your street address, including your apartment number, if applicable?

ADDRESS>

CITY What city do you live in?

CITY>

ZIP And your zip code?

ZIP>

ID. And how do you prefer to be identified?

OPN>

ASSURE Once again, I assure you that all of the information you provide and your responses to both surveys will remain completely confidential.

CONCLUDE Thank you. That concludes our survey. Your participation is deeply appreciated.

[INTERVIEWER: CODE GENDER, LANGUAGE OF INTERVIEW, LEVEL OF COOPERATION]

APPENDIX B.1. Mail survey (English)

Dear Participant,

Thank you for taking the time to complete our recent telephone survey regarding your household's use and disposal of pest control products and for agreeing to participate in our follow-up survey. Your answers will become an important part of our scientific study and will be used by University of California researchers to develop educational programs.

We have enclosed a questionnaire to be filled out by a member of your household. Please complete the enclosed material and return it in the envelope provided at your earliest convenience. All of the responses that you provide will remain confidential and you are free to decline to answer any survey question that you do not wish to answer.

After we have received the completed survey, we will send you a pre-paid calling card that will give you 60 minutes of national telephone time, or less time if you call internationally. We cannot process your incentive gift without your signature, so it is very important that you sign the form on the last page where indicated.

If you have any questions regarding your rights as a human participant, please contact Ms. Lori Jennex, Regulatory Compliance Coordinator, at 714-278-7640. If you have specific questions about the survey, please contact me at 858-694-2846 or via E-mail: cawilen@ucdavis.edu

We thank you in advance for your participation in this important research.

Sincerely,

Dr. Cheryl A. Wilen
Lead Researcher
University of California Cooperative Extension

Note: Be sure to sign in the space provided on page 7 to receive your pre-paid calling card.

1. For each of the following items found on a pest control package, please indicate if you read each of the items 1) In the store before you purchase a pest control product, 2) Just before or while you are using the product, or 3) You do not read it.

	1) Read in store	2) Read just before or while using	3) Do not read
Brand name			
Manufacturer			
Directions on how to use			
Directions on how to mix			
Description of what product does			
Information about effects on human health			
Information about effects on pets			
Information about effects on water, wildlife or environment			
Product ingredients			
Information about how or where to store product			

2. How important are each of the following factors in determining your choice of what product to purchase? Please indicate if it is “Very important”, “Somewhat important” or “Not important”.

	Very important	Somewhat important	Not important
Price			
Have a coupon			
Don't need to mix with water			
Easy to apply			
Have used it before			
Other (Please specify):			
Other (Please specify):			
Other (Please specify):			

3. Where would you **prefer** to get additional information about pest control?
 (Please check no more than 3).

- From the manufacturer by mail or phone
- From product packaging
- Poison control center
- Product brochure
- Government agency
- Poster
- Store employee
- Friend/neighbor/co-worker
- Store display
- Newspaper
- TV
- Radio
- University, Master Gardener, or Cooperative Extension
- Library
- Environmental group
- Consumer group
- Internet
- Other (Specify) _____
- I don't need additional information

4. If you have a pet, please circle your answer to the following statements. If you do not have a pet in your household, please skip to Question 5.

I have fleas in my house or on my pet.....NO YES

I control fleas on my pet by washing with a special shampoo or flea dip.....NO YES

I control fleas on my pet using flea control pill or applying a liquid pest control product to my pet's back or food.....NO YES

I control fleas by applying a pest control product to my yard.....NO YES

If yes, do you use: Granules or Liquid

I control fleas by applying a pest control product in my house.....NO YES

If yes, do you use: Fogger Liquid or Dust or Granules

5. On average, how often is a pest control product used in or around your home?

- Every 1 to 7 days
- Once every 2-3 weeks
- Once a month
- Once every few months
- Once every year
- Less than once every year
- Never

6. Please indicate whether you “Strongly agree”, “Somewhat agree”, “Somewhat disagree”, or “Strongly disagree” with each of the following statements:

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Products I can buy in a store are safe to use or I wouldn't be able to buy them.				
Information on the product label is often hard to understand.				
The writing on the product label is too small so I don't try to read it.				
When using a pest control product, I rely on my own experience rather than what is on the label.				
Products advertised as “environmentally friendly” or “natural” don't work as well as other products.				
I purchase pest control products with the fewest harmful effects.				
The more of the pest control product I use, the better it will control the pest.				
I can identify most pests myself.				
I measure out the correct amount needed, as directed on the instructions.				

7. Please indicate if you have either purchased and/or used a Lawn or Garden product to control A) Weeds, B) Insects, or C) Plant diseases in the past 12 months.

7A. Have you purchased and/or used a product to control weeds in the past 12 months?.....YES NO
(If no, skip to 7B below)

Number of packages, bottles or cans used in the past 12 months: _____

Form of the product:

- Dry granules or powders (no mixing necessary)
- Ready to use liquid (no mixing with water required)
- Hose and spray (mixes with water while you spray)
- Liquid or dry concentrate (mix with water before spraying)

7B. Have you purchased and/or used a product to control insects in the past 12 months?.....YES NO
(If no, skip to 7C below)

Number of packages, bottles or cans used in the past 12 months: _____

Form of the product:

- Dry granules or powders (no mixing necessary)
- Ready to use liquid (no mixing with water required)
- Hose and spray (mixes with water while you spray)
- Liquid or dry concentrate (mix with water before spraying)

7C. Have you purchased and/or used a product to control plant diseases in the past 12 months?.....YES NO
 (If no, skip to 8 below)

Number of packages, bottles or cans used in the past 12 months: _____

Form of the product:

- Dry granules or powders (no mixing necessary)
- Ready to use liquid (no mixing with water required)
- Hose and spray (mixes with water while you spray)
- Liquid or dry concentrate (mix with water before spraying)

8. How do you dispose of extra pest control products, either that you no longer use or that you mixed too much of?

	Check all that apply	Check the ONE disposal method used most often
Put in the trash		
Pour down the sink or toilet		
Pour down the drain outside		
Pour on the lawn or garden		
Pour in the street		
Give away		
Take to a household waste facility		
Store them in or near my residence		
Other		

9. Do you know where a household waste facility is located?.....YES NO

On the following pages, for **each and every** pesticide you have in or around you home, please answer the following (a pesticide is a product used to control or kill weeds (such as dandelions, crabgrass), insects (such as ants, fleas, whiteflies), or plant disease (such as fungus or black spot). There is room for 8 products. If you have more than 8, check here: and complete the survey with the 8 products you use most often. Please refer to the figures below for answering some of the questions. **For each product, you will be filling in information working down the column. The first column is filled in as an example.**

Figure 1. Description of a pesticide label

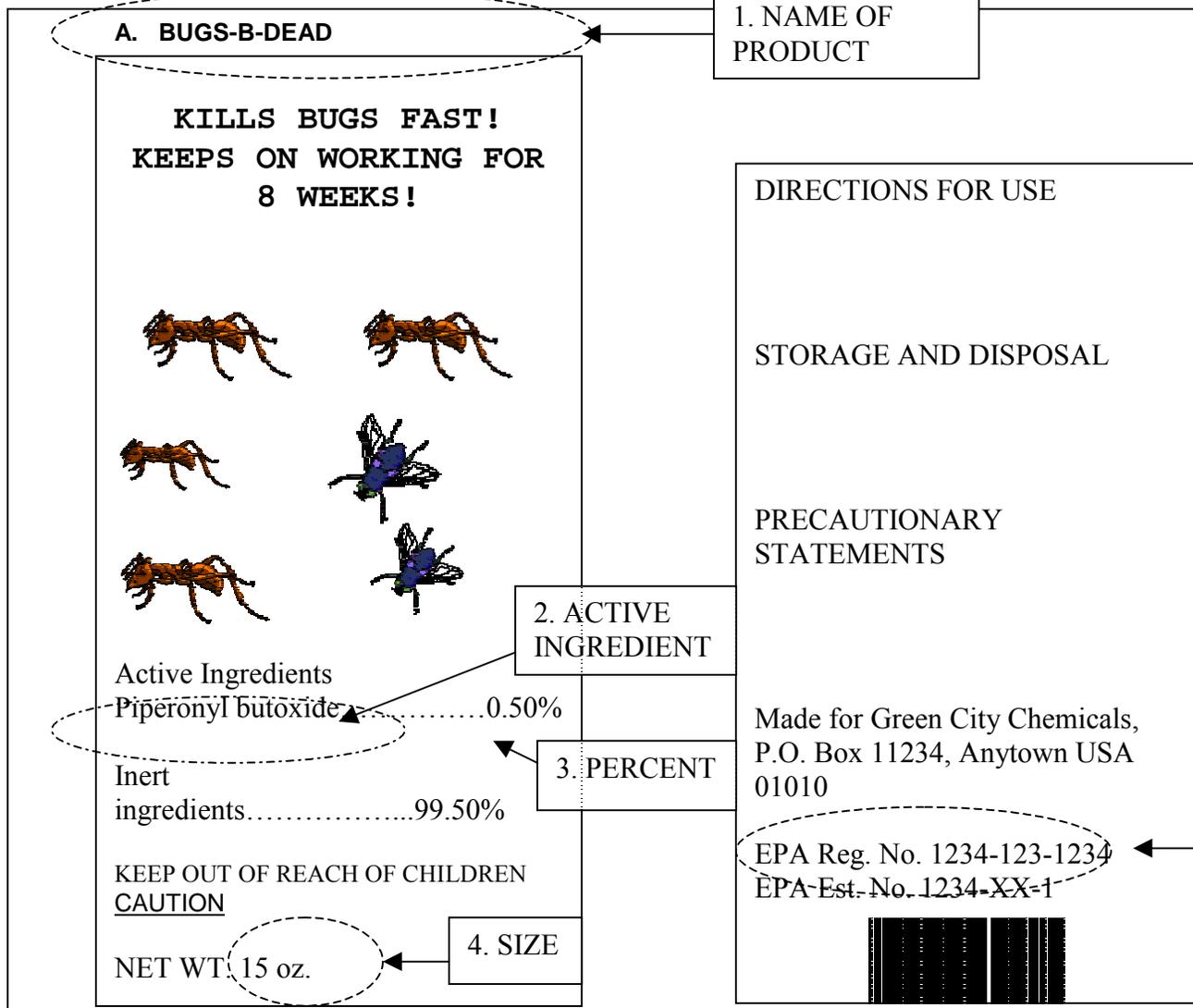
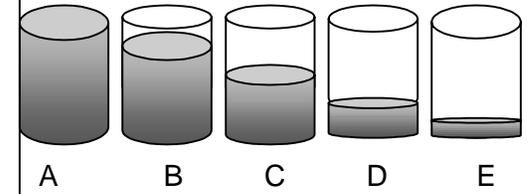


Figure 2. How full is the package?

- A=full or almost full
- B= about ¾ full
- C= about ½ full
- D= about ¼ full
- E=almost none



2. EPA REG. NUMBER

	Product 0 (example)	Product 1	Product 2
What is the product? Find this information on the product's label (see Figure 1)			
1. Name of product:	<u>BUGS-B-DEAD</u>		
2. Active ingredient(s) and/or EPA REG number	<u>PIPERONYL BUTOXIDE</u> 1234-123-123		
3. Percentage active ingredient	0.50%		
4. Size (oz, lb)	15 <input type="checkbox"/> Lb. <input checked="" type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.
What is the FORM of product? A= ready to use spray (pump type), B= compressed gas aerosol spray (similar to spray paint), C= concentrated spray (must add water), D= dry granule (not sprayed, no water added), and E=don't know			
Enter letter here→	B		
What did you use it for? A. Ants, indoors			
Where purchased: Please enter store name. If you can't remember, please enter the type of store. Examples: large home supply store (e.g. Home Depot), discount department store (e.g. Target, K-Mart), grocery or drug store, nursery, hardware store, by catalog or internet, other, don't know			
Store name or type→:	<u>Save-Most Grocery Store</u>		
About how old is the product? A=less than 1 month, B=1-6months, C=6-12 months D=1-2 years E=more than 2 years old			
Enter letter here→	C		
About how full is the package (Figure 2)? A=almost full B=about ¾ full of the package, C=about ½ full, D=about ¼ full, E=almost empty			
Enter letter here→	D		
Where is the product stored?	Inside home <input checked="" type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>	Inside home <input type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>	Inside home <input type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>

	Product 3	Product 4	Product 5
What is the product? Find this information on the product's label (see Figure 1)			
1. Name of product:			
2. Active ingredient(s) and/or EPA REG number			
3. Percentage active ingredient			
4. Size (oz, lb)	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.
What is the FORM of product? A= ready to use spray (pump type), B= compressed gas aerosol spray(similar to spray paint), C= concentrated spray (must add water), D= dry granule (not sprayed, no water added), and E= don't know			
Enter letter here→			
What did you use it for?	B.		
Where purchased: Please enter store name. If you can't remember, please enter the type of store. Examples: large home supply store (e.g. Home Depot), discount department store (e.g. Target, K-Mart), grocery or drug store, nursery, hardware store, by catalog or internet, other, don't know			
Store name or type→:			
About how old is the product? A= less than 1 month, B= 1-6months, C= 6-12 months D= 1-2 years E= more than 2 years old			
Enter letter here→			
About how full is the package (Figure 2)? A= almost full B= about ¾ full of the package, C= about ½ full, D= about ¼ full, E= almost empty			
Enter letter here→			
Where is the product stored?	Inside home <input type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>	Inside home <input type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>	Inside home <input type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>

	Product 6	Product 7	Product 8
What is the product? Find this information on the product's label (see Figure 1)			
1. Name of product:			
2. Active ingredient(s) and/or EPA REG number			
3. Percentage active ingredient			
4. Size (oz, lb)	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.
What is the FORM of product? A= ready to use spray (pump type), B= compressed gas aerosol spray(similar to spray paint), C= concentrated spray (must add water), D= dry granule (not sprayed, no water added), and E=don't know			
Enter letter here→			
What did you use it for?	C.		
Where purchased: Please enter store name. If you can't remember, please enter the type of store. Examples: large home supply store (e.g. Home Depot), discount department store (e.g. Target, K-Mart), grocery or drug store, nursery, hardware store, by catalog or internet, other, don't know			
Store name or type→:			
About how old is the product? A=less than 1 month, B=1-6months, C=6-12 months D=1-2 years E=more than 2 years old			
Enter letter here→			
About how full is the package (Figure 2)? A=almost full B=about ¾ full of the package, C=about ½ full, D=about ¼ full, E=almost empty			
Enter letter here→			
Where is the product stored?	Inside home <input type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>	Inside home <input type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>	Inside home <input type="checkbox"/> Outside home <input type="checkbox"/> Garage <input type="checkbox"/>

Thank you very much for completing and returning this survey. Your help is crucial to help solve important issues facing southern California.

Signature _____
Please sign above to receive your pre-paid calling card. Thank you.

APPENDIX B.2. Mail survey (Spanish)

Estimado Participante,

Gracias por haber tomado el tiempo para completar la reciente encuesta telefónica sobre el uso y desecho de productos para el control de plagas en su residencia. También le damos las gracias por haber decidido participar en esta encuesta. Sus respuestas serán una parte importante de nuestro estudio y serán usadas por investigadores de la Universidad de California para crear programas educacionales.

Hemos incluido una encuesta que debe ser completada por un miembro de su residencia. Por favor complete la encuesta incluida y regrésela en el sobre proporcionado a su más temprana conveniencia.

Después de que hayamos recibido la encuesta completa, le mandaremos una tarjeta telefónica prepagada que le dará sesenta minutos de llamadas nacionales o menos tiempo si llama internacionalmente. No podremos enviarle su tarjeta si no tenemos su firma. Por eso es muy importante que usted firme la forma en la última página donde está indicado.

Si usted tiene alguna pregunta sobre sus derechos como participante humano, por favor contactar a Ms. Lori Jennex quien es la coordinadora de Regulación de Conformidad 714-278-7640. Si usted tiene preguntas específicas sobre la encuesta, por favor contácteme al 858-694-2846 o via correo electrónico al cawilen@ucdavis.edu

Le agradecemos por adelantado su participación en esta investigación tan importante.

Sinceramente,

Dr. Cheryl A. Wilen
Investigadora principal
Universidad de California
Extensión Corporativa

Nota: Este seguro firmar en el espacio proveido en la pagina para 7 para recibir su tarjeta prepagada

1. Para cada unos de los siguientes artículos que se encuentran en una etiqueta de un producto para el control de las plagas, por favor indique si usted lee cada uno de los siguientes artículos 1) En la tienda antes que usted compre el producto, 2) Justo antes o durante que usted está usando el producto, o 3) Usted no lo lee

	1) Lee en la tienda	2) Lee justo antes o durante que está usando	3) No lo lee
Marca			
Fabricante			
Instrucciones sobre uso			
Instrucciones sobre como mezclar			
Descripción sobre lo que hace el producto			
Información sobre efectos a la salud humana			
Información sobre efectos a las mascotas			
Información sobre efectos a el agua, vida salvaje, o ambiente			
Ingredientes del producto			
Información sobre cómo o dónde guardar el producto			

2. ¿Qué tan importante es cada uno de los siguientes factores cuando decide que producto comprar?

Por favor indique si es “Muy Importante”, “Algo Importante”, o “No Es Importante”

	Muy Importante	Algo Importante	No Es Importante
Precio			
Tener un cupón			
No tener que mezclar con agua			
Fácil para aplicar			
Lo ha usado antes			
Otro (Por favor especifique):			
Otro (Por favor especifique):			
Otro (Por Favor especifique):			

3. ¿En dónde prefiere obtener información adicional sobre el control de plagas?
(Por favor no seleccionar más de tres).

- De el fabricante por correo o teléfono
- De el paquete en que viene el producto
- Centro de control de tóxicos
- Folleto del producto
- Agencia de Gobierno
- Poster/cartel
- Empleado de tienda
- Amigo/vecino/compañero de trabajo
- Exhibición en tienda
- Periódico
- Televisión
- Radio
- Universidad, Jardinero Principal, o Extencion Cooperativa
- Internet
- Biblioteca
- Grupo del cuidado del ambiente
- Grupo de consumidor
- Otro (Especifique) _____
- No necesito información adicional

4. Si Ud. tiene una mascota por favor circule sus respuestas a las siguientes declaraciones. Si usted no tiene una mascota en su hogar por favor pase a la pregunta numero 5.

Tengo pulgas en mi casa o en mi mascotaNO SI

Controlo las pulgas de mi mascota con un champú especial o un baño desinfectante?NO SI

Yo controlo las pulgas de mi mascota usando pastillas para el control de pulgas o aplicando un liquido para el control de pulgas en a la espalda o comida de mi mascotaNO SI

Controlo las pulgas aplicando un producto para el control de plagas en mi jardínNO SI

Si contesto sí, usa usted Gránulos or Líquidos

Controlo las pulgas aplicando un producto para control el control de plagas en mi casaNO SI

Si contesto sí, usa usted: Vaporizador, Luquido, O Polvo/Gránulos

5. ¿En promedio con qué frecuencia se usa un producto para control de plagas adentro o alrededor de su hogar ?

- a. Cada 1 a 7 dias
- b. Una vez cada 2 a 3 semanas
- c. Una vez al mes
- d. Una vez cada cuantos meses
- e. Una vez al año
- f. Menos de una vez al año
- g. Nunca

6. Por favor indique si usted esta “Totalmente de acuerdo”, “Algo en acuerdo”, “Algo En Desacuerdo”, o “ Totalmente En Desacuerdo” con las siguientes frases.

	Totalmente De Acuerdo	Algo De Acuerdo	Algo En Desacuerdo	Totalmente En Desacuerdo
Productos que puedo comprar en una tienda son seguros para usar, o no los pudiera comprar.				
Información del producto en la etiqueta es difícil de entender.				
La escritura en la etiqueta del producto es tan pequeña que ni la trato de leer				
Cuando uso un producto de control de plaga, yo dependo de mis propias experiencias, en vez de lo que esta en la etiqueta				
Productos promocionados como “Bien para el Ambiente” o “Naturales” no trabajan tan bien como los otros productos.				
Compro productos para controlar plagas que producen el mínimo efecto dañino				
Entre más productos para control de plagas uso, más controlo la plaga				
Puedo identificar la mayoría de las plagas yo mismo/a.				
Yo mido la cantidad correcta requerida, como lo indican las instrucciones.				

7. Por favor indique si Ud. ha comprado o usado un producto para el pasto o jardín que controle A) Plantas silvestres, B) Insectos, o C) Enfermedades de plantas en los últimos 12 meses .

7A. Ud. ha comprado o usado un producto para controlar las plantas silvestres en los últimos 12 meses ?SI NO
(Si no, pase al 7B)

Numero de paquetes, botellas o latas usadas en los últimos 12 meses: _____

Tipo de Producto :

- Gránulo seco o polvos (no es necesario mezclar)
- Liquido listo para usar (no es necesario de mezclar con agua)
- Manguera y Spray (se mezcla con agua mientras rocea)
- Liquido o concentrado seco (se mezcla con agua antes de rocear)

7B. Ha Ud. Comprado o usado un producto para controlar los insectos en los últimos 12 meses?.....SI NO
(Si no, pase a 7C)

Numero de paquetes, botellas o latas usadas en los últimos 12 meses: _____

Tipo de producto:

- Gránulo seco o polvos (no es necesario mezclar)
- Liquido listo para usar (no es necesario de mezclar con agua)
- Manguera y spray (se mezcla con agua mientras rocea)
- Liquido o concentrado seco (se mezcla con agua antes de rocear)

7C. Ha Ud. comprado o usado un producto para controlar las enfermedades de plantas en los últimos 12 m.....SI NO
(Si no, pase al 8)

Numero de paquetes, botellas o latas usadas en los últimos 12 meses: _____

Tipo de producto:

- Gránulo seco u polvos (no es necesario mezclar)
- Líquido listo para usar (no es necesario de mezclar con agua)
- Manguera y spray (se mezcla con agua mientras rosea)
- Líquido o concentrado seco (se mezcla con agua antes de rocear)

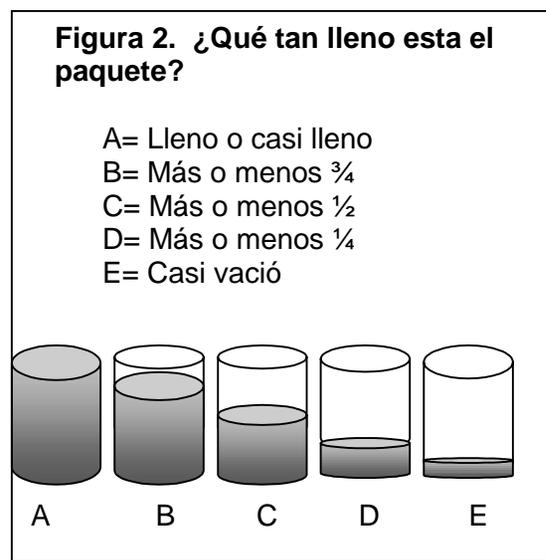
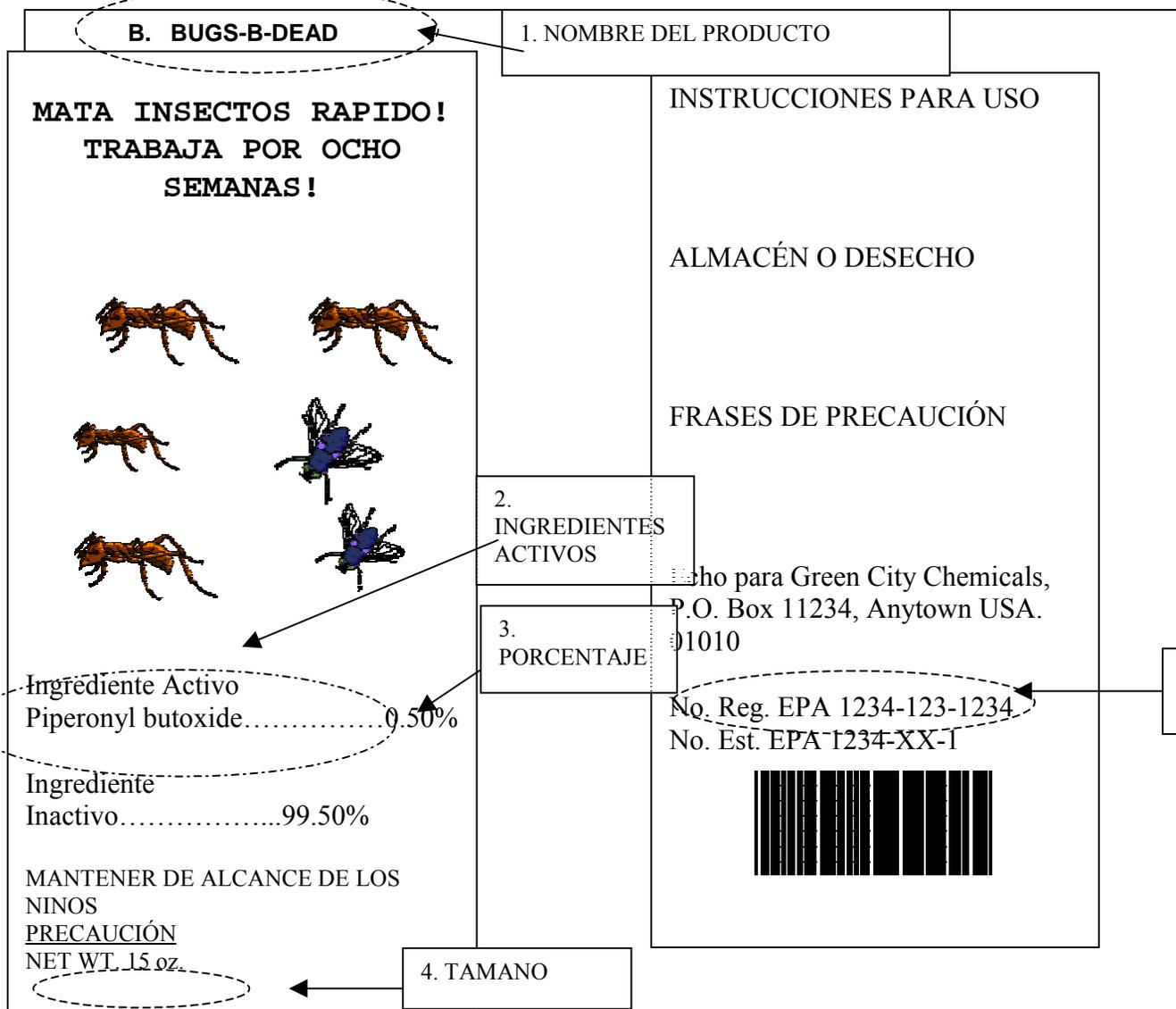
8. ¿Cómo dispone Ud. de productos de control de plagas que ya no usa o que haya mezclado de más?

	Marque todos lo que apliquén	Marque el metodo que Ud. con mayor frecuencia
Pone en la basura		
Basiar en el lavabo o en el inodoro		
Basiar en el drenaje de afuera		
Basiar en el pasto o jardín		
Basiar en la calle		
Regalar		
Llevar a un instalación de desechos tóxicos de la casa		
Guardar dentro o cerca de mi residencia		
Otro		

9. ¿Sabe Ud. dónde esta localizada una instalación de desechos tóxicos?SI NO

En las siguientes paginas, por favor responda lo siguiente por **cada uno** de los pesticidas que Ud. tiene dentro o alrededor de su hogar (un pesticida es un producto usado para controlar o matar plantas silvestres (como diente de león y otras yerbas), insectos (como hormigas, pulgas, moscas), o enfermedades de plantas (como hongos). Hay espacio para 8 productos. Si Ud. tiene más de 8, marque aquí: y complete la encuesta con los 8 productos que Ud. usa con más frecuencia. Por favor consulte las figuras debajo para contestar algunas de las preguntas. **Por cada producto Ud. va estar llenando información en las columnas. La primera columna ha sido llenada como un ejemplo.**

Figura 1. Descripción de la etiqueta del pesticida



	<u>Producto 0 (ejemplo)</u>	<u>Producto 1</u>	<u>Producto 2</u>
¿Cuál es el producto? – Encuentre esta información en la etiqueta del producto (Mire Figura 1)			
1. Nombre del producto	<u>BUGS-B-DEAD</u>		
2. Ingrediente(s) activo(s) y/ o Numero Reg. EPA	<u>PIPERONYL BUTOXIDE</u> 1234-123-123		
3. Porcentaje del ingrediente activo	0.50%		
4. Tamaño (oz, lb)	15 <input type="checkbox"/> Lb. <input checked="" type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.
¿Qué tipo de producto es? A= Un spray listo para usar (como para limpia vidrios), B= Un spray de aerosol (como bote de pintura), C= Un spray concentrado (tiene que añadir agua) D= Gránulo seco(no es spray, no requiere agua) E= No sabe			
Marque letra aquí→	B		
¿Para qué lo uso?			
	D. Hormigas, dentro de la casa		
¿Dónde fue comprado?: Por favor escriba el nombre de la tienda. Si no se acuerda, por favor escriba el tipo de tienda. Ejemplos: tienda grande de artículos para el hogar (eje. Home Depot), tienda de descuento (eje. Target, K-Mart), tienda de comida o una farmacia, vivero, tienda de herramientas, por catalogo o Internet, otro, no sabe			
Nombre o tipo de tienda →:	<u>Tienda Save-Most</u>		
¿Qué tan viejo es el producto? A= Menos de 1 mes, B= 1-6 meses, C= 6-12 meses D= 1-2 años E= Más de 2 años			
Marque letra aquí→	C		
¿Qué tan lleno está el paquete? (Figura 2)? A= Casi lleno B= Más o menos ¾ C= Más o menos ½ D= Más o menos ¼ E= Casi vacío			
Marque letra aquí→	D		
¿Dónde guarda el producto?	Dentro de la casa <input checked="" type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>	Dentro de la casa <input type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>	Dentro de la casa <input type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>

	Producto 3	Producto 4	Producto 5
¿Cuál es el producto? – Encuentre esta información en la etiqueta del producto (Mire Figura 1)			
1. Nombre del producto			
2. Ingrediente(s) activo(s) y/ o Numero Reg. EPA			
3. Porcentaje del ingrediente activo			
4. Tamaño (oz, lb)	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.
¿Qué tipo de producto es? A= Un spray listo para usar (como para limpia vidrios), B= Un spray de aerosol (como bote de pintura), C= Un spray concentrado (tiene que añadir agua) D= Gránulo seco(no es spray, no requiere agua) E= No sabe			
Marque letra aquí→			
¿Para qué lo uso?	E.		
¿Dónde fue comprado: Por favor escriba el nombre de la tienda. Si no se acuerda, por favor escriba el tipo de tienda. Ejemplos: tienda grande de artículos para el hogar (eje. Home Depot), tienda de descuento (eje. Target, K-Mart), tienda de comida o una farmacia, vivero, tienda de herramientas, por catalogo o Internet, otro, no sabe			
Nombre o tipo de tienda →:			
¿Qué tan viejo es el producto? A= Menos de 1 mes, B=1-6 meses, C= 6-12 meses D= 1-2 años E= Más de 2 años			
Marque letra aquí→			
¿Qué tan lleno esta el paquete? (Figura 2)? A= Casi lleno B= Más o menos ¾ C= Más o menos ½ D= Más o menos ¼ E= Casi vacío			
Marque letra aquí→			
¿Dónde guarda el producto?	Dentro de la casa <input type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>	Dentro de la casa <input type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>	Dentro de la casa <input type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>

	Producto 6	Producto 7	Producto 8
¿Cuál es el producto? – Encuentre esta información en la etiqueta del producto (Mire Figura 1)			
1. Nombre del producto			
2. Ingrediente(s) activo(s) y/ o Numero Reg. EPA			
3. Porcentaje del ingrediente activo			
4. Tamaño (oz, lb)	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.	<input type="checkbox"/> Lb. <input type="checkbox"/> Oz.
¿Qué tipo de producto es? A= Un spray listo para usar (como para limpia vidrios), B= Un spray de aerosol (como bote de pintura), C= Un spray concentrado (tiene que añadir agua) D= Gránulo seco(no es spray, no requiere agua) E= No sabe			
Marque letra aquí→			
¿Para qué lo uso?	F.		
¿Dónde fue comprado: Por favor escriba el nombre de la tienda. Si no se acuerda, por favor escriba el tipo de tienda. Ejemplos: tienda grande de artículos para el hogar (eje. Home Depot), tienda de descuento (eje. Target, K-Mart), tienda de comida o una farmacia, vivero, tienda de herramientas, por catalogo o Internet, otro, no sabe			
Nombre o tipo de tienda →:			
¿Qué tan viejo es el producto? A= Menos de 1 mes, B=1-6 meses, C= 6-12 meses D= 1-2 años E= Más de 2 años			
Marque letra aquí→			
¿Qué tan lleno esta el paquete? (Figura 2)? A= Casi lleno B= Más o menos ¾ C= Más o menos ½ D= Más o menos ¼ E= Casi vacío			
Marque letra aquí→			
¿Dónde guarda el producto?	Dentro de la casa <input type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>	Dentro de la casa <input type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>	Dentro de la casa <input type="checkbox"/> Fuera de la casa <input type="checkbox"/> Garaje <input type="checkbox"/>

Muchas gracias por haber completado y regresado esta encuesta. Su ayuda es critica para ayudar a resolver temás importantes para el Sur de California.

Firma _____

Por favor firme arriba para que Ud. pueda recibir su tarjeta telefónica prepagada. Gracias.

APPENDIX C Mail Survey Coding Categories

What is the name of the product?

1. Bayer Advanced Garden Tree/ Shrub
2. Black Flag Flying Insect Killer
3. Bug B Gone
4. Bug Geta
5. Cooke Fruit And Vegetable Spray
6. Diazinon
7. Green Light Granules
8. Hartz 2 In 1
9. Hot Shot
10. Isotox
11. Malathion
12. Ortho Funginex
13. Ortho Klor
14. Ortho Rose Pride
15. Ortho Weed-B-Gone
16. Raid
17. Raid Flea Killer Plus
18. Real-Kill
19. Roach Busters
20. Round-Up
21. Rose Defense
22. Schults Bug Spray White Fly And Mealy Bug
23. Spectracide/ Spectracide Immunox
24. Systemic Rose And Flower Care
25. Systemic Grass And Weed Killer
26. Term Out
27. Weed B Gone
28. Weed And Feed
29. Holiday Flea And Tic Killer
30. Black Leaf 5/ Diazinon Dust
31. Ant Control
32. Sulphur
33. Vigoro Tomato Dust
34. Boric Acid
35. Sevin 5/ Dust
36. Ortho Ant Stop
37. Flea-B-Gone
38. Tomato And Vegetable Insect Killer
39. Safer
40. Vigoro Snail And Slug Killer Pellets
41. D-Con Four/ Gone Automatic Room Fogger
42. Advantage Topical Solution
43. Ant And Roach Killer
44. Fungicide
45. Advanced Garden
46. Ortho Home Defense
47. Eliminator

48. Ortho Bug-Geta Snail And Slug Killer
49. Quick Action Gopher Mix
50. Hornet And Wasp Killer
51. Volk Oil Spray
52. Ant Stop
53. Power House
54. Hartz Rid Flea Shampoo
55. Combat Quick Kill Formula
56. Black Flag Ant And Roach Killer
57. Worry Free Slug And Snail
58. Vet-Kem Flea And Tick Powder
59. Echo's Mouse And Rat Pellets
60. Ortho Diazinon
61. Slug And Snail Killer Granules
62. Orthenex
63. Kleenup
64. Ortho Earwig, Roach, Sawbug Bait
65. Grants Kills Ants
66. Safer Houseplant Insect Killer
67. Rose Pride Orthenex
68. Bug Stop Pc500
69. Grass And Weed Killer
70. Cutler
71. Ortho
72. Scott's Turf Butcher Halts
73. Ortho Malathion ?? Plus
74. That's It
75. Sav-On Ant And Roach Killer
76. Rain Ant Killer – Unscented
77. Raid Ant Baits
78. Raid Flea Please Carpet Powder
79. Dixel Systematic Plant Insecticide
80. Rodent Bait
81. Maxathrax
82. Strike Home Insect Killer
83. Enoz
84. Ultra Shield
85. Spectracide Terminate
86. Bugs-B-Dead
87. Home Insect Control
88. Ortho Volck Oil Spray
89. Real Kill Grass And Weed Killer
90. Hartz Blockade
91. Dexol Dursban Lawn Insect Killer
92. Green Sweep Weed And Feed
93. Basus
94. House Plant And Garden Spray
95. Ortho Roses Flower Care
96. Safer Insecticidal Soap
97. Home Defense
98. Weed Stop

99. Insect Fogger
100. Rose And Flower
101. Jasco
102. Sunnyside
103. Raid- Fumigator
104. Scotts Turf Builder And Insect Control
105. Dursban
106. Safer Garden Fungicide
107. Concern
108. Gopher Kill Pellets
109. Deadline
110. Advantage
111. Bioganic
112. Black Flag
113. Hartz Control
114. Raid House And Garden
115. Frontline
116. D-Con
117. Scratchex

What did you use it for?

3. Ants (Including fire ants, Brazilian ants and Argentine ants)
4. Aphids
5. Ashflies
6. Beetles
7. Bees
8. Caterpillars
9. Cockroaches
10. Crickets
11. Fleas
12. Flies
13. Fruit flies
14. Hornets
15. Mosquito
16. Scale
17. Sowbugs
18. Spiders (including black widows)
19. Termites
20. Wasps
21. Waterbugs
22. Whiteflies
23. Worms
24. Yellow Jackets
25. Pill bugs
26. Silverfish
27. Insects - Unspecified
28. Weeds
29. Plant Diseases
30. Animals

- 50. Other
- 98. DK/NR

Where did you purchase the product?

- 1. Large home supply store (Specify name of store, e.g. Home Depot)
- 2. Discount department store (Specify name of store, e.g. Target)
- 3. Grocery or drug store (Specify name of store)
- 4. Nursery (Specify name of store)
- 5. Hardware store (Specify name of store)
- 6. By catalog or Internet (Specify name of seller)
- 7. Ace Hardware
- 8. Albertsons
- 9. Amway Catalog
- 10. Armstrong
- 11. Costco
- 12. Crown Hardware
- 13. El Toro Nursery
- 14. Fedco
- 15. Flowerrdale
- 16. Food For Less
- 17. The Green Thumb
- 18. Home Base
- 19. Home Depot
- 20. K Mart
- 21. Laguna Hills Nursery
- 22. Lucky's
- 23. Long's Drugs
- 24. Orange County Farm Supply
- 25. Orchard
- 26. Petco
- 27. Ralphs
- 28. Rite Aid
- 29. Roger's Garden
- 30. Sav-On Drugstore
- 31. Silver Creek
- 32. Southern California Growers
- 33. Stater Bros
- 34. Target
- 35. Trader Joe's
- 36. Vons/ Pavillions
- 37. Walmart
- 38. Mexico
- 39. Given to me
- 50. Other

Appendix D. Active ingredients of pesticides from the in-home inventory.

<u>Active Ingredient</u>	<u>Type*</u>	<u>Number of Occurrences</u>
lime-sulfur	F	1
myclobutanil	F	1
sulfur	F	1
triforine	F	2
Neem oil	F/I	1
2,4-D	H	5
diquat dibromide	H	5
fluazifop-p-butyl	H	3
glyphosate	H	8
MCPP	H	1
mecoprop	H	1
MSMA	H	1
pendimethalin	H	1
triclopyr	H	1
acephate	I	4
allethrin	I	4
arsenic trioxide	I	1
bacillus thuringiensis	I	2
bifenthrin	I	5
boric acid	I	2
carbaryl	I	5
chlorpyrifos	I	11
cyfluthrin	I	4
cypermethrin	I	11
DEET	I	2
diazinon	I	14
disulfoton	I	2
esfenvalerate	I	2
eugenol	I	1
fenbutatin oxide	I	2
fenoxycarb	I	1
fipronil	I	3
hydramethylnon	I	1
imidacloprid	I	3
imiprothrin	I	14
malathion	I	5
methoprene	I	1
para-dichlorobenzene	I	1
permethrin	I	12
phenothrin	I	3
piperonyl butoxide	I	13
potassium salts of fatty acids	I	4
propoxur	I	10
pyrethrin	I	14
resmethrin	I	4
silicon dioxide	I	1
tetramethrin	I	4
tralomethrin	I	8
iron phosphate	M	2
metaldehyde	M	8

brodifacoum	R	2
warfarin	R	2
zinc phosphide	R	1

*F=Fungicide, H=Herbicide, I=Insecticide, M=Molluscicide, R=Rodenticide

APPENDIX E RESPONDENT DEMOGRAPHICS: RDD AND MAILED SURVEY

Because participation in the mailed “home inventory” was voluntary, analyses were conducted to determine whether those that consented to participate differ in systematic ways from telephone survey respondents that declined to participate in the mailed survey. Recall that to qualify, respondents had to reside in single-family detached homes. Among all survey completions, 905 (56.5%) respondents were qualified and 698 (43.5%) were not. Five respondents did not report their type of residence and could not be classified.

To refine this comparison, qualified respondents were classified into three groups: those that completed the in-home mailed survey, respondents that requested the in-home survey but did not return it, and respondents that declined to participate in the mail survey. Table 40 depicts the number and proportion of respondents in each of these categories.

Table E.1. Qualified respondents (residents of single-family detached homes)

Survey Status	Frequency	Percent
Completed In-home mailed survey	133	14.7%
Requested but did not return mailed survey	356	39.3%
Eligible, but declined to participate in mailed survey	416	46.0%
Total	905	100.0%

The sections below describe comparisons between qualified (residents of single-family detached homes) and all other RDD survey respondents, and between the three mailed survey status groups of qualified respondents only.

Gender Differences: Qualified and Other RDD Respondents and Mailed Survey Status

There are no significant differences between qualified and unqualified respondents, nor between the three levels of qualified respondents depicted in Table 25 above.

Age Differences: Qualified and Other RDD Respondents

RDD respondents not qualified to participate in the mailed survey averaged approximately 37 years of age, while respondents residing in single-family detached homes averaged approximately 42 years. These differences are statistically significant ($F=42.14$, $p < .001$)

Age Differences: Mailed Survey Status

Respondents that completed the mailed survey averaged approximately 44 years of age, as did respondents that declined to receive the mailed survey. The average age of the 346 respondents that requested the mailed survey but did not return it is approximately 40 years. Although not of great practical importance, these differences are statistically significant ($F=7.39$, $p < .001$).

Race/Ethnicity/ Language Differences: Qualified and Other RDD Respondents

As presented in Table 41 on the next page, almost equal proportions of English-speaking Latinos (65.8%) and African Americans (65.1%) qualify for the mailed survey (reside in single-family detached homes), compared to 56.7% of Caucasians, 55.4% of Asians, and 50.5% of Spanish-speaking Latinos. These differences between racial/ethnic/ language categories are statistically significant ($\chi^2 = 17.30$, $p. < .01$).

Table E.2. Respondent race/ ethnicity and language spoken at home and residence in a single-family detached home.

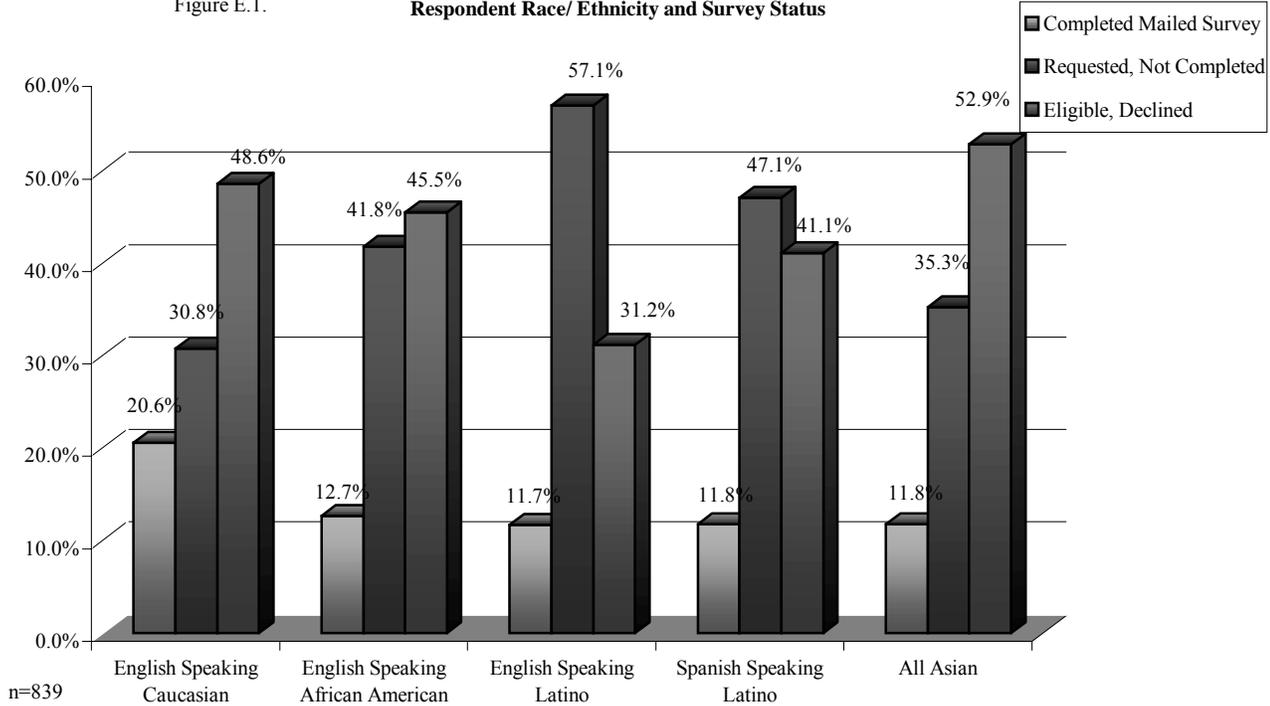
Race/ Ethnicity and Language Spoken	Frequency	Percent
English-speaking Latino	77	65.8%
African American	110	65.1%
Caucasian	321	56.7%
All Asian	51	55.4%
Spanish-speaking Latino	280	50.5%

Race/Ethnicity/ Language Differences: Mailed Survey Status

As illustrated by the figure below, over one-half (52.9%) of the Asian respondents declined to participate in the mailed survey, compared to 48.9% of Caucasian respondents, 45.5% of African American respondents, 41.1% of Spanish-speaking Latinos, and 31.2% of English-speaking Latinos. Note that although only 31.2% of Latino respondents that report speaking English at home declined to participate in the mail survey, a rather large proportion (57.1%) requested the survey, but did not complete it. These differences between racial/ethnic/language categories are statistically significant ($\chi^2 = 31.66$, $p. < .001$).

Figure E.1.

Respondent Race/ Ethnicity and Survey Status



Income Differences: Qualified and Other RDD Respondents

As depicted in Table 42, the proportion of respondents that reside in single-family homes and thus qualified for the mailed survey increases for each income category up to respondents with annual incomes between \$45,000 and \$69,999 annually. The proportion of respondents residing in single-family detached homes drops to 63.2% for respondents that earn between \$70,000 and \$99,999 per year and then increases slightly to 65.2% of respondents that earn over \$100,000 annually. The percentages in Table 42 are computed based upon valid replies.

Table E.3. Respondent income and proportion of residents in single-family detached homes.

Income	Frequency	Percent
Under \$15,000	103	42.4%
\$15,000 to \$24,999	97	46.0%
\$25,000 to \$44,999	151	54.1%
\$45,000 to \$69,999	150	68.2%
\$70,000 to \$99,999	72	63.2%
Over \$100,000	60	65.2%

p. <.001

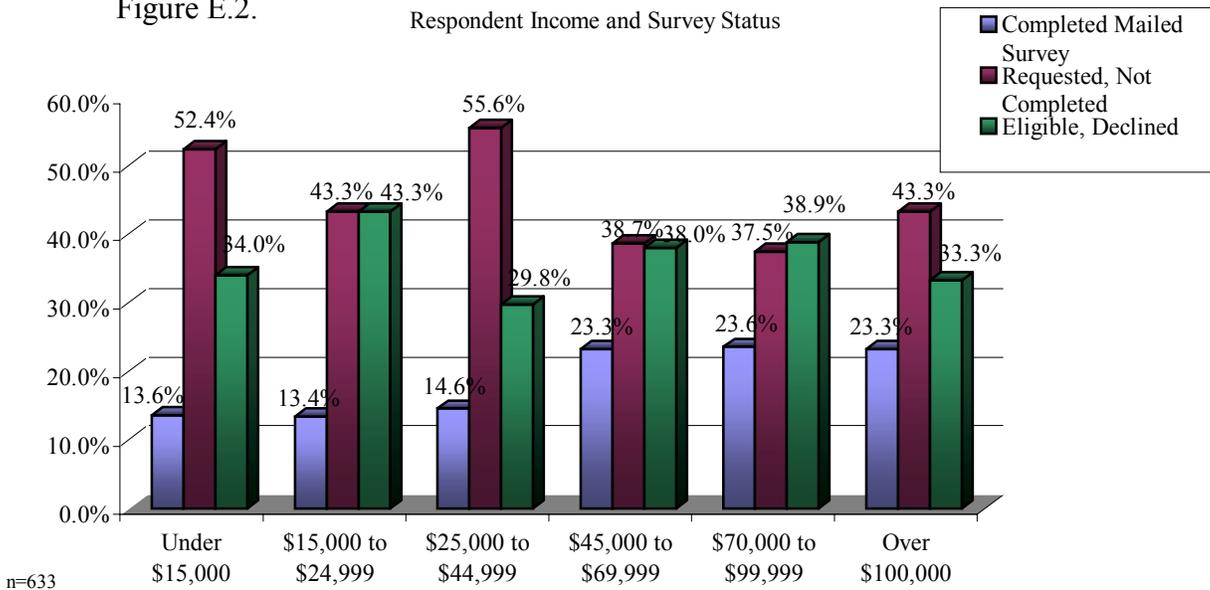
Income Differences: Mailed Survey Status

As depicted in the figure below, almost equal proportions of respondents that earn less than \$15,000 per year (13.6%), between \$15,000 and \$24,999 (13.4%) and between \$25,000 and \$44,999 (14.6%) completed the mailed survey (the first bar in each series of three). Similarly, a higher proportion (23%) of the respondents in each of the higher income categories completed the mail survey. Over one-half (55.6%) of the respondents that earn between \$25,000 and \$44,999 annually or earn less than \$15,000 (52.4%) requested, but did not complete and return the survey (note the highest bars in the middle of each series of three). These differences between income and mailed survey status are statistically significant ($\chi^2 = 18.46, p. < .05$).

City of Residence Differences: Qualified and Other RDD Respondents

Figure E.2.

Respondent Income and Survey Status



The proportion of respondents that qualified to participate in the mailed survey by virtue of residence in a single-family detached home is significantly different between cities. Just over 86% of the residents of Lemon Grove that participated in the RDD survey reside in single family detached homes, compared to 66.8% of Santa Ana residents, 59.4% of San Diego residents and to 47.4% of residents in Costa Mesa.

Table E.4. City of residence and residence in a single-family detached home.

Income	Frequency	Percent
Lemon Grove	25	86.2%
Santa Ana	135	66.8%
San Diego	468	59.4%
Costa Mesa	277	47.4%

p. <.001

City of Residence Differences: Mailed Survey Status

The proportion of respondents in each mailed group is not significantly different between cities.

Level of Education Differences: Qualified and Other RDD Respondents

As shown in Table 44 below, 62.8% of respondents with a high school diploma currently reside in a single-family detached home, compared to 57.8% of respondents with a college degree, 55.9% of respondents with a post-graduate degree, 55.4% of respondents with some college and 48.6% of respondents with some less than a high school education. The results are statistically significant.

Table E.5. Respondent level of education and residence in a single-family detached home.

Highest Level of Education	Frequency	Percent
Some high school or less	190	48.6%
High school graduate	221	62.8%
Some college	204	55.4%
College graduate	177	57.8%
Post-graduate degree	66	55.9%

p. < .01

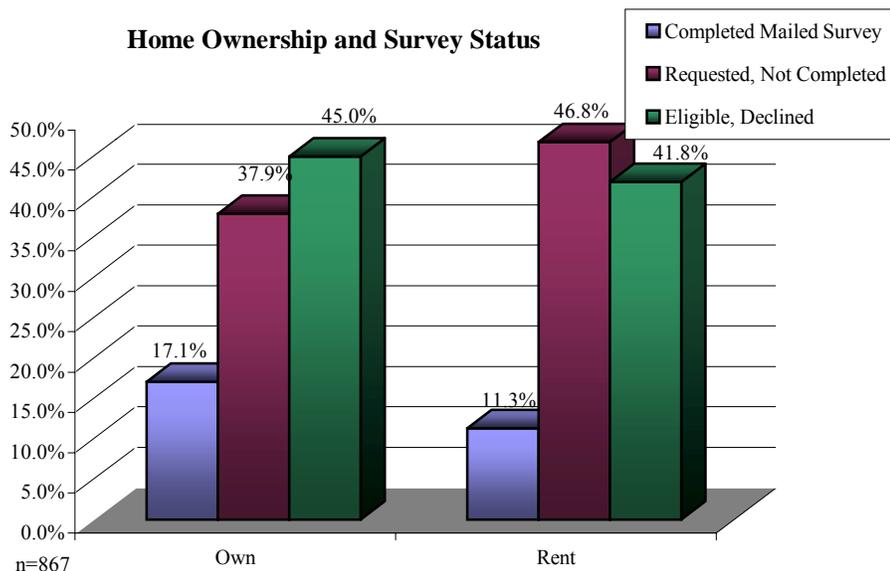
Level of Education Differences: Mailed Survey Status

Level of education is not statistically related to mailed survey status.

Home Ownership Differences: Mailed Survey Status

As depicted by the first bar in each series in the graph below, 17.1% of the RDD telephone respondents that own their residence completed the mailed survey, compared to 11.3% that rent. Approximately 47% (46.8%) of respondents that rent a single-family detached home requested the survey, but did not complete and return it, compared to 37.9% of respondents to the telephone RDD survey that own their residence (the middle bar in each series). These differences are statistically significant ($\chi^2 = 8.21$, p. < .05).

Figure E.3.



To summarize, there are no significant gender differences between qualified and other RDD respondents or between the three mailed survey groups. There are significant age differences, but this may be of little practical importance. There are significant income, city of residence, educational attainment, and race/ ethnicity/ language differences between qualified respondents and all other RDD respondents. Qualified and other RDD survey respondents differ significantly in income, home ownership, and race/ ethnicity/ language.

Who Applies Outdoor Pest Control Products Differences: Qualified and Other RDD Respondents

Qualification to participate in the mailed survey is significantly related to responsibility for the application of outdoor pest control products. Table 45 below shows the proportion of survey respondents in each category of “who applies outdoor products” that reside in single-family detached homes. As shown in the table, 77.8% of respondents that indicated that someone within their household is responsible for the application of pest control products reside in single-family detached homes compared to 19.5% of respondents that indicated that an outside company is responsible for the application of pest control products. These differences are statistically significant ($\chi^2 = 454.02$, $p < .001$).

Table E.6. Proportion of Qualified Respondents (Reside in Single-Family Detached Homes) and “Who Applies Outdoor Pest Control Products”

Who Applies Products	Frequency	Percent
Home Application	502	77.8%
Outside Company	102	19.5%
Home and Company	37	77.1%
No Outdoor Products are Applied	198	74.4%

$p < .001$

The relationship between responsibility for outdoor pest control products and survey status (completed the in-home mailed survey, requested the in-home survey but did not return it, and declined to participate in the mail survey) is not statistically significant.